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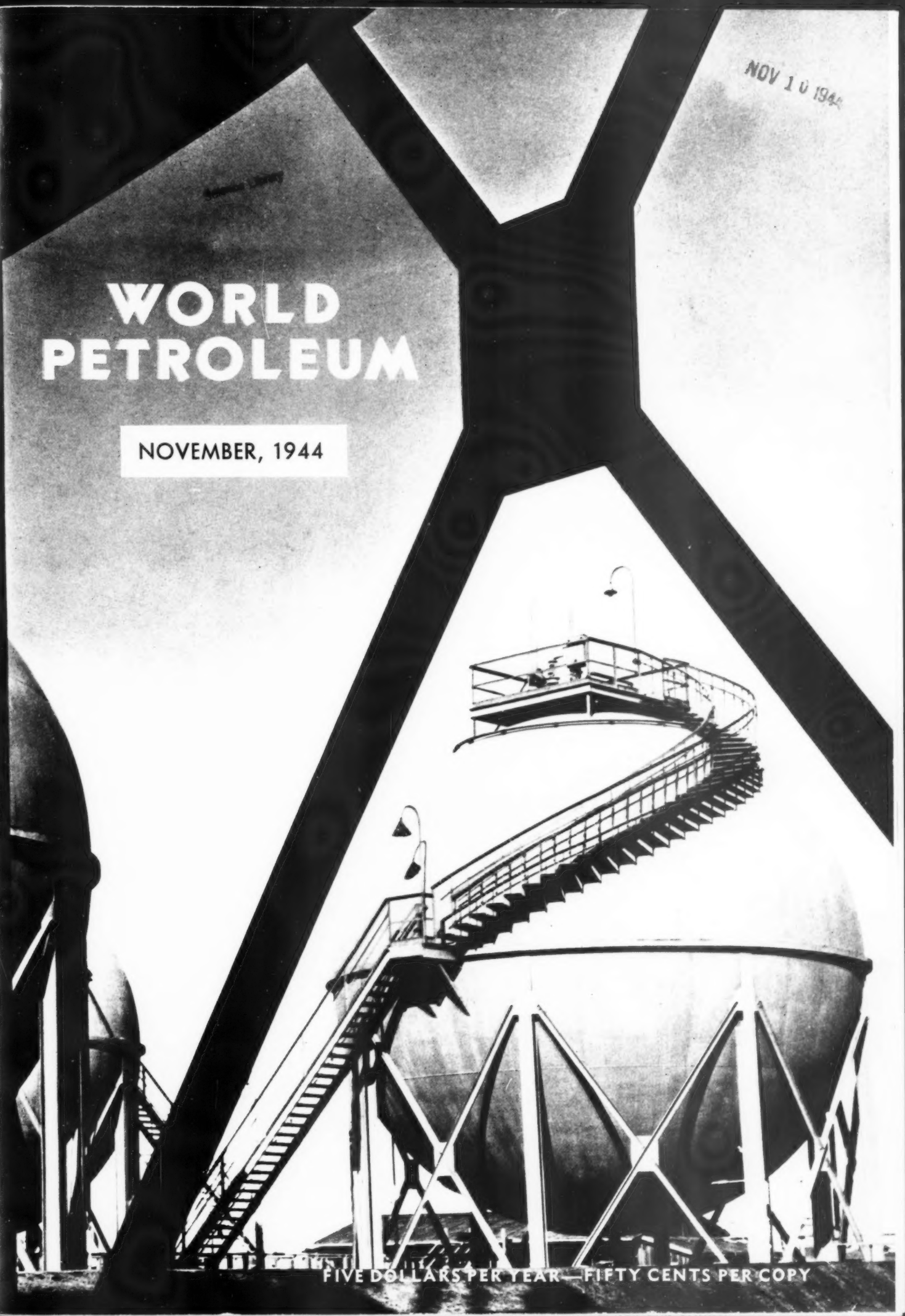
WORLD PETROLEUM

NOVEMBER, 1944



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EDITORIAL

OIL AGREEMENT RAISES BROAD ISSUES

MOUNTING opposition to the British-American oil agreement in the form in which it was finally cast by representatives of the two governments at their conference in Washington last August indicates that it will have to meet a heavy barrage of criticism when it is submitted to the full and free discussion promised by Chairman Connally of the Senate Foreign Relations Committee. In fact, it already is evident that unless accompanied by qualifying amendments and limitations ratification of the document will be unacceptable not only to a majority of the oil industry but to many others outside its ranks.

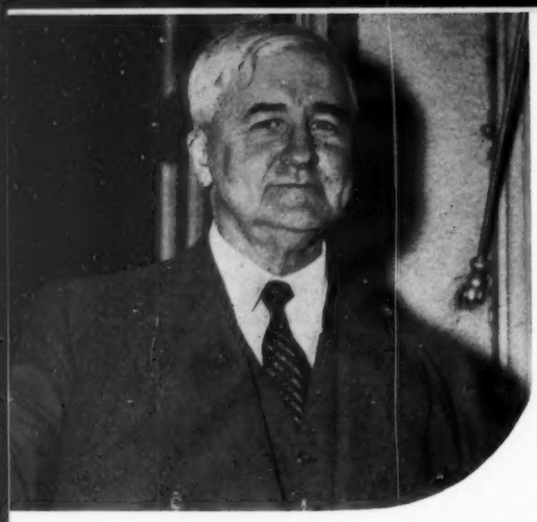
Objections to the agreement as it stands range from the violent antagonism of those who call for its outright rejection to proposals for the addition of clauses which will definitely assure that it cannot be used as an instrument to extend federal or international control to the oil industry within the United States or to abrogate the authority over domestic operations now vested in Congress and the individual states. The possibility so insistently emphasized by Mr. George Hill that in ratifying the agreement as a treaty Congress will abdicate its own power to determine or to modify the national policy toward the country's internal oil affairs is one that the law makers themselves are not likely to view with equanimity.

As has been pointed out previously in these pages the difficulty with the agreement is that it attempts to unite two proposals which properly call for separate treatment. The sections that define the attitude of each of the governments toward the rights and concessions held by nationals of the other, that assure equal opportuntiy with respect to exploration and development in new areas and that guarantee that there shall be no efforts unlaterally to interfere with contracts or holdings legitimately acquired, have aroused no opposition or protests. They constitute a declaration of fair play and seek to remove possible causes of friction that might bring the two into conflict.

Along with this altogether laudable undertaking however is coupled the project for a convention to regulate international trade in oil. The language in which this proposal is couched is so general and so indefinite that it is capable of a variety of interpretations. Its declarations that supplies be made available in accordance with the principles of the Atlantic Charter, that they shall be provided for all peaceable countries at fair prices, are sound doctrine but highly indefinite.

The agreement provides however for setting up an international petroleum commission. This commission is charged with the task of preparing long term estimates of world demand and recommending the manner in which this demand can best be satisfied by production equitably distributed among the various producing countries. There is no indication as to the authority that will attach to the findings and proposals of this commission. In reality the establishment of machinery for setting limits on production, fixing fair prices or determining the quantities of petroleum products required to meet the economic needs of consuming countries necessarily must depend upon the collaboration of many nations aside from the two that have formulated this agreement.

Nevertheless, the inclusion in the agreement of proposals looking toward the establishment of an intergovernmental body with potential authority extending over every phase of oil industry operation, together with the very indefiniteness of the contemplated scheme, is responsible for the fear and suspicion with which the agreement is viewed. Much, perhaps all, of this suspicion and opposition could have been avoided if the document had been confined to a declaration governing the relations of Britain and the United States in matters affecting petroleum, coupled with the proposal that a world conference be called to formulate a convention regulating international trade in oil products which in turn would be submitted for approval by the constituted authorities of the nations participating. It is safe to say that objections will come from countries other than the United States to any world organization empowered to control the internal operations of their industries and that no such regime is within the realm of practicality. This being the case there is every reason why it should be made clear in this preliminary agreement. It should be definitely specified also that any convention that may be subsequently proposed for the governance of international trade in oil—or in any other world commodity for that matter—shall receive the approval of the national legislature before the United States is finally committed to it. This may have been in the minds of the American negotiators but even the best friends of the agreement acknowledge that it is faulty in wording and in need of clarification.



Jesse Jones

OIL INDUSTRY DEMOBILIZATION

Remains Problem for Future Action

By William J. Maddox

No Definite Program Decided Upon for Relaxation of Federal Controls or Liquidation of War Agencies—Disposal of Government's Huge Investment in Plants and Pipe Lines Likely to Become Subject of Controversy.

LIKE many other problems of post-war planning, the demobilization of the oil industry has been drifting in the doldrums of pre-election absorption in politics. To date Congress has contributed little, if anything, toward dispelling the uncertainties that will face the industry when peace comes, and administrators in the various agencies concerned with petroleum won't even speculate on solutions of the problems involved. If any planning is being done, authorities don't admit it, and apparently what thought has been given the various issues has not jelled into anything resembling a program.

Topmost among these problems, and probably the most knotty, are what to do with the government-owned 100-octane and synthetic rubber plants and the post-war use of the "Big Inch" and the "Little Big Inch" pipe lines. Also, there is the return to the states of the regulatory authority over drilling and production now exercised by the Petroleum Administration for War and the removal of restrictions on price and distribution held by the Office of Price Administration. Then, too, there is the disposition of federal lands acquired by the government for war use.

As for the rubber and high-octane plants and the pipe lines, Congress, just before the pre-election exodus of the legislators from Washington, rushed through a surplus property disposal bill (H.R. 5125) designed to set up the machinery for coming to grips with these problems. The legislation, now officially known as the Surplus Property Disposal Act of 1944, places the general disposition of the plants and the pipe lines along with other surplus war property under a board of three and provides in considerable detail the methods to be pursued. However, the legislation has its defects, as the President pointed out in signing it. He said:

"It is with considerable reluctance that I have decided to sign this bill. While I am in full accord with the declared objectives of the bill which are to aid reconversion from a war to a peace economy and to facilitate the orderly disposal of surplus property, I have considerable doubt whether many provisions of the bill will not make extremely difficult the accomplishment of its objectives. There is danger that the confused methods of disposition and the elaborate restrictions imposed by the bill will in many instances delay rather than expedite reconversion and reemployment. Our surplus property should speedily be placed into channels of disposition which should provide the most jobs and the greatest good for the greatest number."

He expressed the "hope" that after the board has had "some experience" in operating under the act, Congress would give "careful consideration" to changes that are found necessary. The board is required to submit to Congress within three months after enactment of the act, October 3, a report that will cover the pipe lines and plants costing $5,000,000 and more, that will (1) describe the amount, cost, and location of the property with information on its use, (2) outline the economic problems that may be created by disposition of the property, and (3) set forth a plan or program for the care, handling, disposition, and use of the property consistent with the policies and objects of the act.

In arriving at its decision on what to do with the various properties, the board is to consult with the various government agencies concerned with their present operation. This probably is welcome to some of them, as it relieves them of the throes of making the decision themselves and leaves them well back of the firing line when the shooting begins. So much for the machinery of surplus disposal. Setting that up promises to be vastly more simple than arriving at a decision on how each type of property is to be handled.

With the 100-octane and synthetic rubber plants and the pipe lines, for instances, there are at least five methods of disposal to be canvassed. Shall they be sold to private interest, leased to private operators, run by the government, held in reserve as stand-by facilities, or scrapped?

Post war use of the "Big Inch" and its sister line the "Little Big Inch" is in the realms of pure speculation. What to do with these is admitted on all sides to be a tremendous problem and one that few responsible people are willing to hazard even a guess on. In some ways, they resemble "white elephants". One thought appears to dominate all speculation, however, and that is that both the pipe lines should be continued in some form of service as a matter of national defense. What this service is to be, though, involves a number of knotty problems, some of them seemingly as difficult as any encountered by the industry and government in meeting war demands.

Fundamentally, the post-war disposition of the "Big Inch" is tied up with the potentialities of the East Texas field. If used as a carrier of crude, the line if operated at its capacity of 300,000 barrels a day would bleed the field white. Production there is supposed to hit its peak at 350,000 barrels a day. More than this brings in water. Texas oil men, therefore, express considerable doubt that enough crude could be obtained to keep the line filled. To carry less, the line might not be economical to operate. The Texas companies now say they are "running their legs off" trying to feed this giant. No one company controls enough crude to keep the line operating at capacity. The opinion is expressed that nothing can be done with the "Big Inch" until a number of companies get together and buy it.

Another serious stumbling block to the proposal to use the line for crude is the fact that Texas is anxious to maintain and develop its own refineries. Gulf Coast companies naturally prefer to bring the East Texas crude down to their own refineries. They have been stopped from doing this because of the adjustments necessitated by the war. East Texas crude which they had been using themselves is now going to feed the "Big Inch" and being taken to Midwest and East Coast refineries.

Gulf Coast companies have been obliged to reverse their lines and take what they consider "inferior" crude, some from West Texas, which they find expensive to handle. Nobody, they say, is going to pay this difference in cost after

Senator Guy M. Gillette

war when they don't have to use types of crude they don't like to run. But if they turn to the "sweet" crude of East Texas, they will be robbing the "Big Inch".

As for the "Little Big Inch" products line, this may not be able to compete with tanker transportation to the East Coast, which will no doubt be resumed when the war is over. And the prospect is that an abundance of this form of carrier space will be available for the service.

One big "if" is in the cost of tanker haul versus pipe line. Reconstruction Finance Corporation Chairman Jesse Jones has never disclosed what tariff has been established for the operation of the two big pipes. Basing a comparison on a 42-cent a barrel tanker rate to the East Coast. Jones has figured that "if" no pipe line had been built it would have cost about $1.50 to get the oil to the East—which yields a paper saving of approximately $1. This leaves a lot of unknown factors dangling in the air and does not lend itself to concrete planning. The mystery surrounding the comparative rates probably will have to wait till after the war to be dispelled.

Some suggestions have been forthcoming that the lines be converted to natural gas. But doubt is expressed in some quarters that there will be enough gas in East Texas to operate the lines efficiently. The prolific gas fields are in other parts of the state, particularly in the Panhandle district which is hundreds of miles from the terminus of either of the "Inch" systems.

Disposition of the synthetic rubber plants promises to provoke one of the bitterest controversies of post-war reconversion and one that undoubtedly will have international repercussions. Agricultural leaders in Congress, such as Senator Guy Gillette of Iowa, who see in synthetic rubber manufacture an outlet for surplus farm crops as sources for alcohol, are already preparing for the fight. They are for building up the industry, but only in so far as it is a consumer of alcohol.

Gillette was quick to react to the announcement of the forthcoming London rubber conference, with the United States joining with Great Britain and the Netherlands in setting up a group to study common problems arising from the production, manufacture, and use of rubber—natural, synthetic and reclaimed. He hurried off a letter to the State Department full of questions for Secretary Hull to answer.

The Iowa Senator, whose subcommittee has held extensive hearings on synthetic rubber and alcohol, told Mr. Hull that "we have developed the production of synthetic rubber from both petroleum and agricultural sources to the point where it would appear to be one of the great future industries of our nation".

"At the present time", he continued, "we import a very small amount of natural rubber and are dependent on this synthetic rubber industry for more than eighty-five percent of our supply. We of the subcommittee are loath indeed to note any steps in the direction of again making our nation dependent on any foreign nation or group of nations with monopolistic control of natural rubber supply, in whole or in part. Witnesses before our group gave evidence that the former rubber monopoly was greatly concerned over the development of synthetic rubber in our nation and interposed many obstacles.

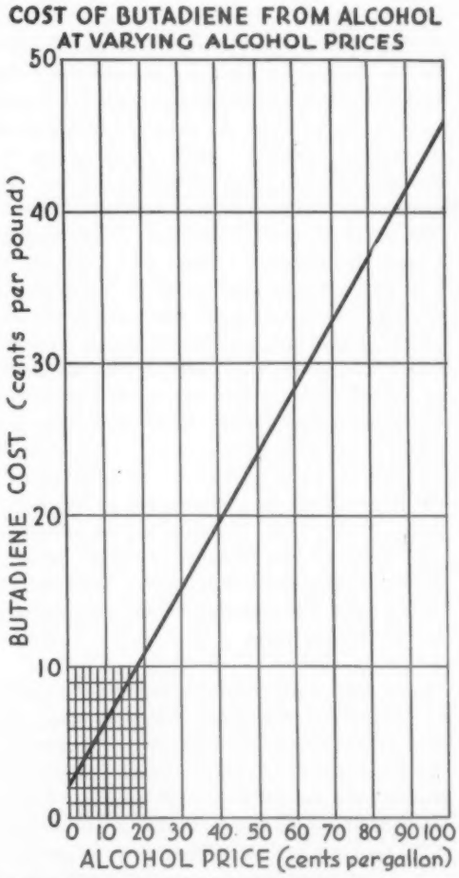
"I fail to see just what the conference could discuss. Do they wish again to be assured that they are to participate in the American market for crude rubber at the expense of our own synthetic industry? Do they seek trade policies which will assure them of a competitive position in that market to the disadvantage of synthetic rubber production? Or do they wish to furnish us a market for our production of synthetic rubber? In the light of our studies of more than thirty months, I am frank to say that I do not envision any advantage to our nation and her industries that would not be available to us without such a conference, and I can envision action which might result seriously in its impact on our own great new industry of synthetic rubber production from our agricultural sources and from our forest wastes and from petroleum products".

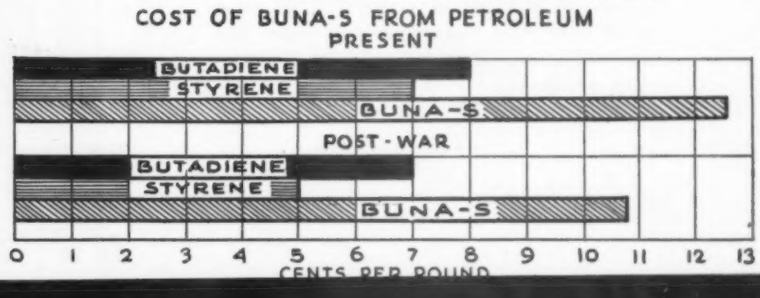
In the opinion of Reconstruction Finance Corporation Chairman Jesse Jones, who has played banker to the plants: "Many of the synthetic rubber facilities can be used in competition with natural rubber, but disposition and operation of the plants should be switched to private industry on some basis fair both to the government and to industry.

"We have built this important industry, which is vital to our economy and national safety, in little more than two years, at a cost of $750,000,000. It is definitely a success. The investment was made necessary by the war, but it could be justified on economic grounds as insurance for all time against rubber monopolies even though we have no more wars. The technique in the production, manufacture, and use of synthetic rubber is constantly being perfected, and it now appears that synthetic rubber can compete in price, quality and use with natural rubber. Some synthetic rubbers are superior to natural rubber for certain purposes."

Jones believes that disposing of government plants and facilities is not a job that can be hurried "unless we are willing practically to give them away". This would be a great mistake, in his opinion, and would prove unjust to privately owned manufacturing properties and to the taxpayer.

Col. Bradley Dewey





"Already some have suggested 10 or 15 cents on the dollar as a fair price for a government plant or for government facilities placed in private plants", the RFC Chairman recently said. "Such bargain hunters will do irreparable harm to business and industry. No formula can be evolved for disposing of these properties that will fit the many different kinds and sizes. Furthermore, any who may be interested in acquiring a plant will naturally be cautious, at least for a time. A continuation of a lease program such as RFC's Defense Plant Corporation has used in many cases for war production, may provide a solution. It should be possible for us to evolve terms of sale or leases fair enough to encourage risk-taking. It is all a matter of sound business negotiation.

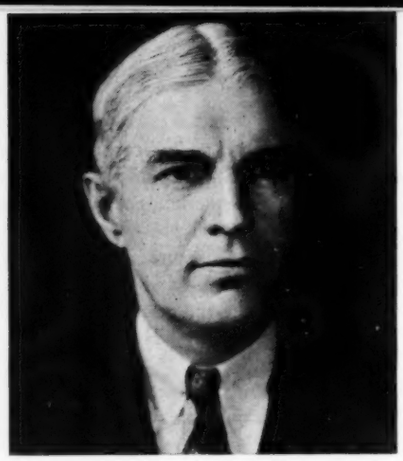
"All government plant investments impose a responsibility upon government which must be very carefully weighed. There will be a body of public opinion which will want some and perhaps many of the plants operated by the government, or for government account.

"It is my conviction that every plant that can be used in the production of something useful in our peacetime economy, should be saved, and converted to such production by private enterprise on terms that are fair both to government and to business."

According to former Rubber Director Bradley Dewey, looking at the question more from the angle of plant management, those who will have to decide as to the post-war handling of the low-cost synthetic rubber plants owned by the government "may well seek a way by which they can be operated to give a reasonable return to the operator and yet permit him to sell the resultant rubber at a price which will set such a ceiling on crude rubber as to preclude any ill-considered speculative plantings which in the long run would result in temporary over-production, followed by the death of synthetic rubber and more world-wide orgies of limited production and high prices for crude rubber.

"If it seems best to aim at prices in the neighborhood of 15 or 16 cents per pound there may well be some formula by which industry and the government will realize some return in lieu of a full amortization or rental charge for all its war costs.

"Some will argue that the important point is to realize that the money has been spent for war purposes and that without any charge for depreciation any postwar return should be looked upon as an accidental bonanza, not as the just due of the money already spent. Others will argue that the plants should not be operated unless they bring the government a full return on at least their replacement cost under postwar conditions. Postwar leaders will inherit these problems.

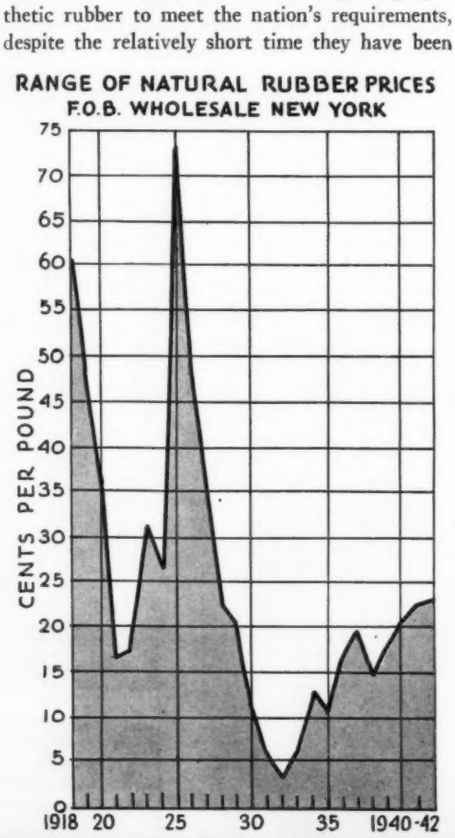


William L. Clayton

"But, come what may, the synthetic rubber program . . . has already served notice that prices of 16 cents a pound for crude rubber in the United States . . . will mean plenty of competition from synthetics."

In spite of these optimistic statements by the men who have been closely associated with the synthetic rubber program the greatest fear of those who want to see this infant industry preserved is that "high politics" may bring about its demise or partial strangulation. The United States is by all odds the most important rubber market in the world and the business it afforded was the mainstay of plantation rubber interests in the British controlled Malay States and the Dutch East Indies before the war. Representatives of these two governments can advance arguments to prove that restoration of natural rubber production is essential to the economic welfare of their Far Eastern possessions. The course of the Roosevelt Administration in other international dealings is responsible for the suspicion that in the interest of international harmony it might be willing to cooperate in such a proposal to reinstate British and Dutch rubber even though it involved the scrapping of three-quarters of a billion dollars worth of United States owned plants.

The record of the plants now supplying synthetic rubber to meet the nation's requirements, despite the relatively short time they have been in operation, supports the claim that if left to the natural course of competition they can hold their own against natural rubber. The latest report of the Rubber Director, submitted by Col. Bradley Dewey as he relinquished his office on August 31, showed that with raw materials derived from petroleum Buna-S can now be produced at 12.5 cents per pound. In the post-war period it is expected that this cost can be reduced to 10.7 cents or possibly less. This computation does not allow for amortization of plant or return on the investment but covers out-of-pocket manufacturing expense. While the selling price of natural rubber has fluctuated greatly in the period since World War I, ranging from 58 cents a pound to 3.7 cents in 1932 in the depths of the depression, trade opinion holds that it must command a price of 15 to 16 cents to permit profitable operation. Most of the time during the past 20 years the price has been maintained at a much higher level through an international agreement. Public opinion in the United States appears likely to demand the maintenance of the major part of existing synthetic facilities as insurance against future price fixing of this kind.



Senator Gillette has proposed the production of synthetic rubber from alcohol, using grain as the source of alcohol. While this might be a means of providing an outlet for surplus corn and wheat in years of bumper crops the greater cost of alcohol as compared with petroleum would necessitate either a heavy import duty on natural rubber or a government subsidy to make possible its use on a competitive basis. At present the cost of making Buna-S from alcohol is about five times as much as when butylenes or butane is utilized. To put the two methods on an equal basis it is computed that the price of alcohol would have to be reduced to about 15 cents per gallon which could be brought about, if at all, only by using blackstrap molasses, wood wastes or other materials much lower in price than corn or wheat.

Secretary Jones has not been quite so sanguine as to the immediate post-war use of the 100-octane facilities or as definite as to their disposal as he has concerning the synthetic rubber plants. His expressed opinion has been that the expansion of the high-octane aviation facilities is "largely a war cost". These facilities, he believes, will be far in excess of post-war requirements "but as aviation expands, much of the capacity can be used".

The matter of disposing of the vast acreage of government-acquired land for war purposes is a seriously disturbing problem that remains to be solved. More will be heard of it in Congress when the legislators, new and old, assemble in January for the new session. Secretary of Interior Ickes' proposal of turning the land over to his department to handle went down to defeat in the final enactment of the surplus property disposal bill.

INTERSTATE COMPACT COMMISSION

Opposes Anglo-American Oil Agreement

Asserts Ratification as Treaty Would Dispose of Powers to Regulate Industry now Reserved to States by Constitution—Urges Early Return to Local Authorities of War Control now Exercised by Washington and Protests Governmental Retention of Mineral Rights in Federally Acquired Properties.

OPPOSITION to the Anglo-American oil agreement, now awaiting consideration by the United States Senate, was expressed both verbally and in strongly worded resolutions at the fall quarterly meeting of the Interstate Oil Compact commission held in Oklahoma City during the first week of October. Official spokesmen for the oil and gas regulatory bodies of 10 of the 13 member states attended the executive and public sessions of the compact commission, and after personally expressing their views about the international agreement, heard these written into a strongly worded resolution that the compact officials sought to have given national publicity.

Charges that the agreement, if ratified as a treaty, would violate the Constitution and lay the groundwork for nullifying the rights of the Congress and of the states were voiced by Gov. Andrew F. Schoeppel of Kansas, compact chairman; Warwick M. Downing, representing Colorado; N. W. Shiarella, representing Kentucky; Former Governor Sam Jones and Joseph L. McHugh, of Louisiana; W. G. Frye, representing Michigan; Hiram M. Dow, representing New Mexico; Former Governor W. J. Holloway, representing Oklahoma, and who was joined by Governor Robert S. Kerr and J. C. Hunter, representing Texas.

Papers dealing with the question of an international agreement and with federal vs state control were presented by Joseph E. Pogue, vice president of Chase National Bank, New York; Ralph T. Zook, president of the Independent Petroleum Association of America, and Beauford H. Jester, chairman of the Texas Railroad Commission. A forum discussion led by Russell B. Brown of the IPAA gave opportunity for the presentation of questions and for formal expressions of opinion. The sentiment thus elicited was expressed in the following resolution:

"On April 4, 1944, at the meeting of the Interstate Oil Compact Commission which was held at New Orleans, the following resolution was approved:

"Whereas, the National Oil Policy Committee of the Petroleum Industry War Council submitted a preliminary report to the council on February 28, 1944, a copy of which is attached hereto, said report having been approved by the Petroleum Industry War Council on March 1, 1944, and having been given wide distribution throughout the nation: and

"Whereas, the subject of a national policy on oil, both domestic and foreign, is under consideration by a special committee of the United States Senate,: and,

Gov. Andrew F. Schoeppel of Kansas, Chairman of Compact.

"Whereas, the subject of a national oil policy is of deep concern to the Interstate Oil Compact Commission, the oil producing states and the entire membership of the nation:

"Therefore, Be it resolved by the Interstate Oil Compact Commission that it approve the above mentioned preliminary report of the National Oil Policy Committee of the Petroleum Industry War Council and recommend its most careful consideration by the government officials having responsibility for and jurisdiction over the establishment of a national oil policy. We further express the hope that the principles set forth in the preliminary report of the National Oil Policy Committee of the Petroleum Industry War Council will be embodied in the national oil policy ultimately established by the government of the United States."

"Subsequent thereto and on August 24, 1944, the President of the United States submitted to the Senate of the United States for its concurrence and approval a proposed agreement between the government of the United States of America and the government of the United Kingdom of Great Britain and Northern Ireland purporting to embodying the terms of agreement with relation to exploration and development of petroleum resources, which agreement is now pending before the Foreign Relations Committee of the United States Senate for its action. The proposed agreement as submitted does not contain fully the principles set forth in the resolution adopted at New Orleans on April 4, 1944, by this commission and is not in harmony (but is in conflict) with the principles set forth, and therefore this commission objects:

"To the use of the treaty-making device inherent in the Anglo American petroleum agreement to vest in the Congress, or the Executive Department of the United States government, or an International Oil Commission, powers in time of peace not now vested in the federal government under our Constitution:

(A) To fix production quotas in the oil producing areas of the world, including the United States, and the several oil producing states, and

(B) To make market allocations throughout the world, and

(C) To fix prices of oil and its products, or price ceilings, or what may be deemed "fair prices," and

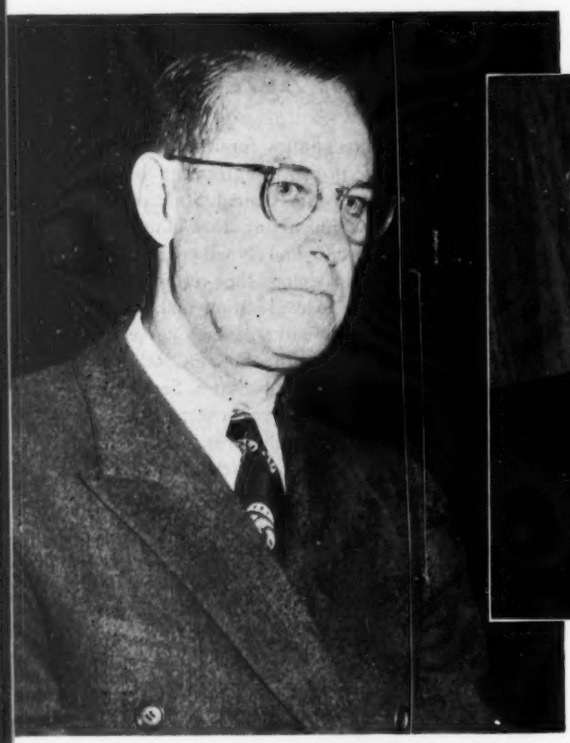
(D) To take jurisdiction over conservation regulations by making determinations of "sound engineering practices" to be effected by federal law or international agreement, and

(E) To regulate our domestic oil business in relation to the economic advancement of foreign oil consuming or foreign oil producing countries, and

(F) To surrender the control of import regulation and duties on foreign oil importations while the United Kingdom preserves "imperial preferences;" and

(G) To vest in an international oil commission the determination of "peaceable" and "nonpeaceable" countries as the basis for eligibility or banishment from international trade in oil, irrespective of whether our nation is otherwise on friendly terms and enjoys amicable relations with such nations: and

(H) To regulate 'the production, processing, transportation, and distribution of petroleum'



Ralph T. Zook

Russell B. Brown

Beauford H. Jester

Joseph E. Pogue

in the United States "except as to the now recognized constitutional regulation of transportation in interstate and foreign commerce;' and

(I) To legalize cartels;

"Now therefore be it resolved by the Interstate Oil Compact Commission in session at Oklahoma City, Oklahoma, on this the 7th day of October, 1944, that we reaffirm the position set forth in the resolution of the commission above referred to as having been adopted on the 4th day of April, 1944, and recommend that the Senate of the United States do not give its consent to the ratification of the Anglo-American petroleum agreement submitted by the President on August 24, 1944".

Immediately preceding the completion of the deliberations of the resolutions committee resulting in the above resolution, there was a general assembly of compact delegates, observers and visitors, at a luncheon given by Gov. R. S. Kerr of Oklahoma. At that gathering George A. Hill, Jr. circulated a petition that was signed by virtually everyone present, embodying the nine clauses contained in the resolutions.

Mr. Hill has been a most conspicuous and uncompromising foe of the proposed treaty ever since its terms were made public. He attacked it in an elaborate statement before the PIWC in which he argued that ratification of the proposal in the form submitted would invalidate the limitations imposed by the Constitution on the exercise of federal power over the industry and would place authority in the hands of an international organization beyond the control of Congress itself. In a letter addressed to members of the Compact Commission Mr. Hill denounced the projected treaty as "an overt manifestation of a planned change in the structure of our government and of the creation of a new and tragic era in which (a) the Atlantic Charter is to become a new international constitution, (b) the treaty making device is to substitute its principles for the constitution of the United States, (c) there is to be created a new type of international corporation to discharge the functions of government beyond the present constitutional powers of our federal government, and (d) a new type of domestic governmental corporation and a fourth department of government without the limitations imposed upon the legislative, executive and judicial departments".

Joseph E. Pogue, internationally known petroleum economist, took the position that while the language of the British American convention required clarification, some form of international oil agreement was essential to provide the United States with an adequate supply of petroleum in the future. He favored an international oil compact, founded on principles of the Interstate Oil Compact Commission and emphasized the importance of industry representation in any such organization.

First of the scheduled talks at the general session was given by Beauford H. Jester, chairman of the Texas Railroad Commission, who urged the oil producing states to seek the aid of Congress in launching plans for post-war days when the governmental restrictions exercised through the Petroleum Administration for War and other agencies are ended or reduced. He went over his correspondence with Petroleum Administrator Ickes and stressed the importance of prompt return to the states of the regulatory authority formerly exercised by them. In evidence of their support of this position the meeting adopted this resolution:

"Whereas the conclusion of hostilities in the present war will bring about the end of emergency war agencies regulating oil and gas production and related matters, and

"Whereas, it is desirable, and necessary, that the power and authority to regulate such matters be returned to the several states for exercise in accordance with the sound principles of conservation, and

"Whereas, there is cause to believe that opposition to the return of these powers to the several oil and gas producing states may develop and that in order to secure a return of these powers the full cooperation of the said states will be required, and

Ex-Gov. W. J. Holloway, Oklahoma, Welcoming Delegates to Compact.

"Whereas, in order to be properly entitled to the return of these powers, the several oil and gas producing states must be enabled by adequate statutory authority and administrative machinery to assume the responsibility necessarily attendant thereto:

"Now, therefore, be it resolved, that the Interstate Oil Compact Commission respectfully calls the attention of the several oil and gas producing states to this obligation and that it urges that immediate steps be taken by said states to perfect and strengthen their respective statutes and administrative agencies and that the coming sessions of their legislatures be appraised of the importance of this problem, to the end that the states will preserve and protect their inherent sovereignty and power to administer and conserve their resources in the public interest.

"Be it further resolved that a copy of this resolution, together with a copy of the address of the Hon. Beauford H. Jester, chairman of the Railroad Commission of Texas, delivered before the Interstate Oil Compact Commission at Oklahoma City, Oklahoma, on October 7, 1944, which address forcefully and ably deals with this subject, be transmitted to the governors and the regulatory agencies of the several oil and gas producing states."

One departure from the traditional policy of the country which the Compact Commission has steadily opposed is the extension of federal ownership to the mineral rights in lands sold by the government. In a report submitted by its Public Lands Committee, which Warwick M. Downing of Colorado is chairman, at the meeting held in New Orleans earlier in the year, attention was directed to the vast expansion of federal ownership of the nation's land which then was stated as nearly 400,000,000 acres or 20 percent of the total area. It was pointed out that the Farm Security Act, adopted in 1937, required that in the sale of lands held by the Farm Security Administration a three-fourths ownership of the mineral rights (including oil and gas) should be retained by the federal government. The report recommended that this provision be rescinded and that in the sale of property acquired by the government for war purposes no such limitation be included.

A further report presented at the Oklahoma City meeting by Mr. Downing, Hiram M. Dow of New Mexico, and George C. Gibbons of Texas said in part:

"We recently learned with dismay the intent to further nationalize our mineral resources as evidenced by the Surplus Property Act recently passed by Congress. The bill as passed by the House provided that the lands should be sold and returned to private ownership without reservation: However, the Senate bill added the provision that when such lands were purchased by other than the original owner or by veterans, then all of the minerals would be reserved to the federal government. It is our understanding that such provision was inserted in the Senate Bill at the instance of the Department of Interior."

W. M. Downing and H. W. Dow

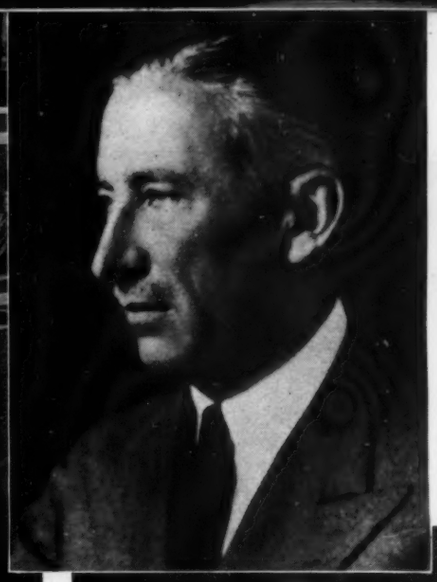
The report recommended that an entire new act covering the public lands should be adopted by Congress.

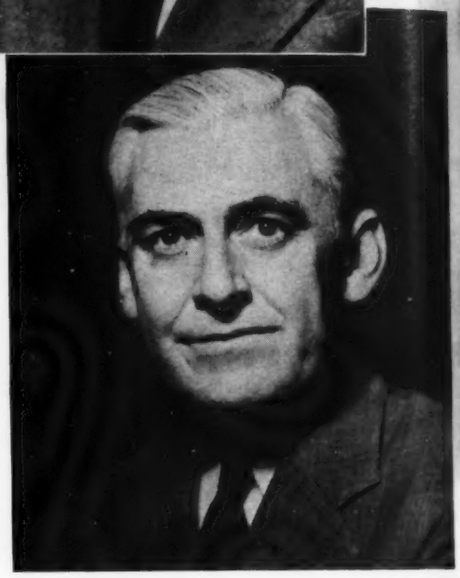
Part of Standard Development's Plant at Bayway, N. J.

STANDARD DEVELOPMENT COMPANY

Completes Quarter Century of Organized Research

Discoveries Contributing to Oil Industry's Progress are Milestones in the Career of Scientfic Group Which Has Grown from Thirty to Two Thousand Workers — Anniversary Observed by Forum on Industrial Research





Top: Frank A. Howara, Retiring Head of Company. *R. P. Russell, Newly Elected President.*

LAST month the Standard Development Company observed its twenty-fifth anniversary. Most appropriately the observance took the form of a forum devoted to a discussion of industrial research which brought together the leaders in this field of activity from many industries and many parts of the country. As was pointed out in the discussions the span of life of Standard Development epitomizes the progress of research and its rise to importance in American industry.

It is not quite enough to say that this research organization has kept its parent company abreast of the times. In its 25 years of existence it has often had the distinction of being ahead of the times, of being in no small degree a creator of progress, a pioneer in opening up new and great developments in the science and practice of petroleum technology.

The act of its creation was in itself a new departure. Twenty-five years ago there was nowhere such a thing as the Standard Development Company was designed to be—and has become. It is true that most large industrial companies, including many oil companies, were doing research and had what they called research departments designed for making useful discoveries; and many of them did make important discoveries. But there was generally a lack of coordination between the research laboratory and the factory or the refinery.

The usual course of events was about as follows: By means of some test tube operations in his laboratory the research chemist would come upon some new product, or some new way of doing

Russell Succeeds Howard

FRANK A. HOWARD has resigned the presidency of Standard Oil Development Company of which he has been the administrative head since its organization twenty-five years ago. R. P. Russell, executive vice president of the company since 1937, has been elected to succeed Mr. Howard.

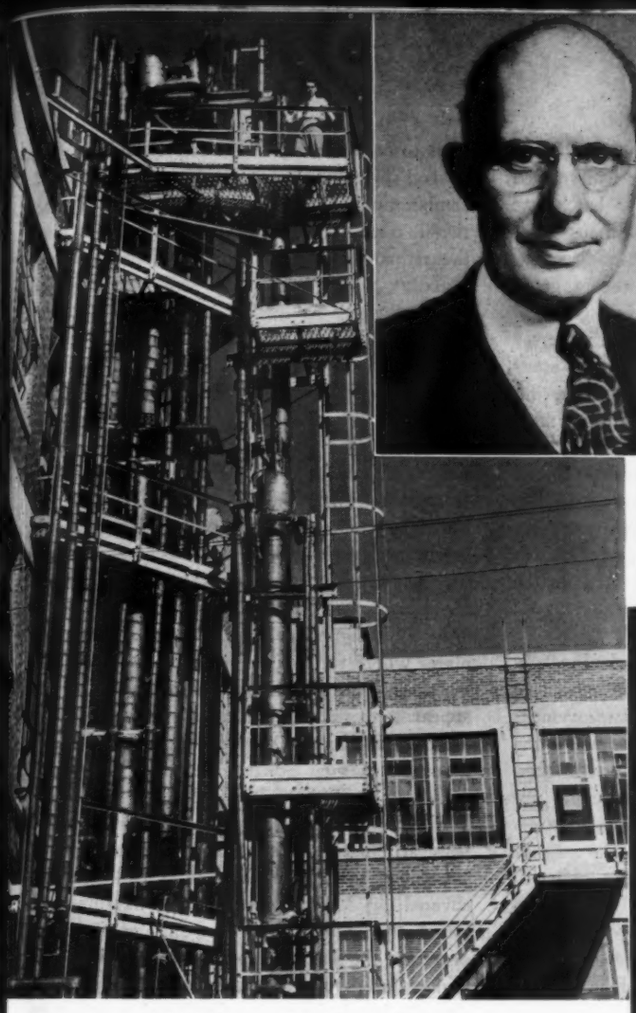
Standard Oil Development Company is the central research organization of Standard Oil Company (New Jersey) and is one of the oldest and largest industrial research organizations in the world. It operates the Esso Laboratories and engineering departments at Elizabeth, N. J. and co-ordinates operation of the Esso Laboratories in Baton Rouge, La., and London.

Mr. Howard's resignation coincided with the Silver Anniversary which the company observed on October 5 by sponsoring a forum on the future of industrial research. Mr. Howard will remain a director of the Development Company and vice president of Standard Oil Company (New Jersey) until after the first of the year when he expects to resume private law practice from which he withdrew in 1919 to organize and manage the industrial research group which eventually became the Development Company. In private practice, he will serve the company as patent counsel.

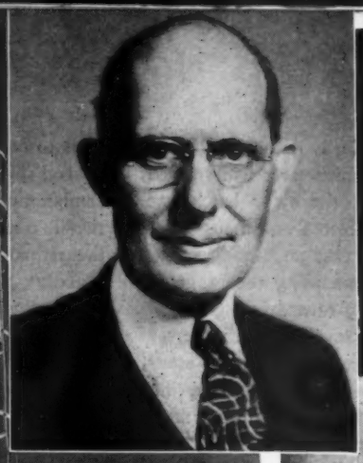
During the 25 years in which Mr. Howard has been the administrative head of the organization it has grown from a staff of 26 to nearly 2,000. Most of the personnel are engineers, chemists and technical specialists.

The new president of the Development Company, Mr. Russell, has been with the company since 1927 when he left an assistant professorship of chemical engineering at Massachusetts Institute of Technology to direct the newly organized Esso Laboratories at Baton Rouge. Since the outbreak of war he has devoted much of his time to emergency technical work for the Office of Scientific Research and Development and the National Defense Research Committee.

W. R. Carlisle has been elected a vice president of Standard Development Company. Mr. Carlisle left the New York law firm of Davis, Polk, Wardwell, Sunderland and Kiendl to join the company in 1930. For several years he made his headquarters in London and was active in the organization of the Esso Laboratories there in 1937.



Solvent Extraction Unit in Company's Laboratories.



R. T. Haslam, Standard Oil Co. (N. J.)

Top: Charles F. Kettering of General Motors, Chairman of First Session of the Silver Anniversary Forum.

Running a Test in the Chemical Products Laboratory.

things. The president of the company would be notified, and the production department would be called on to try it out in the factory. Operating superintendents generally have enough to do to keep normal operations going, and the new idea was apt to get less attention than is deserved. In case the idea should survive this critical period of its infancy it would have to pass through the office of the company's lawyer to determine the patent situation. Then the sales department would have to find out if the product could be sold. Finally the company's chief engineer would set his draftsmen to work on designs for full scale equipment. In all this there would be much lost motion, and often an outright failure to obtain benefits from an important discovery.

This was in general the situation of the Jersey Standard interests 25 years ago. The Jersey group consisted of a number of separately organized operating companies in the United States and foreign countries. A number of these companies maintained their own research laboratories and technical organizations which were more or less coordinated within themselves, and somewhat loosely coordinated with one another. This situation was now to be changed by concentrating all major lines of research and development work of the Standard Oil group into a single well equipped and well financed organization that could take an idea and nurse it through all its stages, from the test tube through the pilot plant and the Patent Office; make plans for marketing; design and build the large scale plant and apparatus, and in the end turn the idea over to the operating department as a going proposition. Such an integrated instrument for technological progress was a novelty of the time, and one that has been copied by other large industrial groups.

One indication of the worth of a completely integrated research organization is the record of the growth of the Standard Development Company. From the 30 employees with which it started 25 years ago it has progressed to the point where in 1944 it needs more than 2,000, of whom more than a third are graduate engineers and chemists, all engaged in pursuit of promising new lines of industrial development in oil. At the same time this super-research organization has not displaced the research organizations of the affiliated companies; these carry on, exchanging information with the SDC and often execute special projects of development work under contract with it.

The full measure of the worth of the organization, however, is the record of its positive contributions to petroleum technology, which have not been confined to Standard Oil interests but have been shared with the petroleum industry as a whole, and with the public which has been the ultimate beneficiary. In the war period it has rendered inestimable services in providing new and better military materials. Today 98 per cent of the work of the 2,000 members of its staff goes into the war effort. During the two war years of 1942 and 1943 it expended more than $12,000,000 on research, and what it has done in that time for the industry and the nation has certainly been worth many times that amount.

Standard Development Company was organized for Standard Oil Co. (N. J.) by Frank A. Howard, a chemical engineer and patent lawyer, who was located in Chicago and had been consultant for Standard Oil of Indiana. The original group which advised and assisted in creating the technical organization included Ira Remsen, then the most outstanding organic chemist of his day; Robert A. Millikan, a great physicist and Nobel prize winner, and Warren K. Lewis, an outstanding chemical engineer who was later to make contributions of tremendous importance to several phases of petroleum technology. From time to time other notable personalities have made contributions of far-reaching importance.

The first significant accomplishment of the new research organization was the development of a process for producing alcohols from the olefins produced as by-products at the Bayway refinery, where the late Carleton Ellis was struggling with a pilot plant for effecting what has since become a standard process for producing alkylated hydro-carbons. There was great need for alcohol and other lacquer solvents at the time, principally for the use of the airplane industry.

Since then the development of the synthetic alcohol industry based on petroleum products has been continuous. The Standard Oil Company has now pushed its production of synthetic alcohols up to some 30,000,000 gallons a year; these include ethyl, isopropyl, butyl and higher alcohols. Two other large companies which later entered this field are also now producing on an enormous scale. The present war effort has greatly benefitted from this development; synthetic ethyl alcohol is figuring very largely as a source material for synthetic rubber; and it is being produced with such efficiency as to lead many chemists to believe that synthetic alcohol made from olefins will be the dominating factor in industrial alcohol supply under post war condition.

The first major oil-industry problem undertaken by the research staff was the development of a satisfactory continuous process for converting heavy petroleum fractions into gasoline. The urgency of this problem was evident from the rapid expansion of the automobile industry, which was calling for more and more gasoline. The petroleum industry was making strenuous efforts to meet this demand, but its methods were unsatisfactory. It already had been found that by overheating a heavy oil it could be broken down into lighter fractions such as kerosene and gasoline. The Burton pressure still had been invented. This was both a great invention and a clumsy apparatus; a batch of crude oil was filled into the still, heated over a fire, and gave off vapors which yielded some gasoline and not a little coke that stuck to the bottom and required frequent cleaning out. Later, this was avoided in the Burton-Clark pressure still which circulated the oil through directly heated tubes without giving coke much opportunity to settle out.

At this point Standard Development took up the problem, and successively evolved two processes which are the bases of the present-day art of thermal cracking. Both these processes were engineering developments of the fundamental chemical principle that the cracking of petroleum is a function of time and temperature. The first of these processes was the double-coil process, in which the oil was heated rapidly to a high cracking temperature in pipes exposed to the radiant heat of the furnace, and then "soaked" or held at this high temperature for a further short period in pipe coils that were exposed only to the mild heating effect of low temperature combustion gases; this latter heating effect was so small that there was little danger of burning the tubes if they became coated with carbon inside. The second form of this development was the "tube-and-tank process" where a relatively large digestor or pressure tank took the place of the low temperature coil and provided the necessary time element for the desired cracking reaction to complete itself.

These two processes became almost immediately the standard process for the cracking of heavy oils in the Jersey Standard refineries. They were covered by patents which were widely used by licensees for replacing the older batch-type of cracking stills; they effected enormous economies both in investment cost and in operating costs, as well as greatly extending the range of oils that could be profitably turned into gasoline. These inventions brought royalties to the Jersey Standard, but they also brought profits to other members of the petroleum industry and inestimable benefit to the great public that was interested in automobiles. It is worth noting that since that time Standard has steadily adhered to the practice of making its patents available on reasonable terms to the entire industry, except such as relate to specialty products for which new markets and new uses have had to be established.

The next major advance in petroleum technology to which the research group made decisive contributions was a revolutionary improvement of a basic operation in petroleum refining—the art of fractional distillation, by which the complex mixture of oils produced by cracking are separated into different grades. When the development company entered the field the average oil refinery was made up of batteries of batch stills which, like the old cracking stills, were mounted in brick settings over a fire. The vapors passed through a series of air cooled towers which effected partial condensation of the heavier components, leaving the lighter portions to be condensed in a water cooled "worm", or coil pipe. The separation effected by this combination of fractional distillation and fractional condensation was very bad, compelling the refiner to operate several batteries of fractionating stills for every still operating on crude oil.

It is generally conceded that the company and perhaps the oil industry in general owes the solution of this problem to the genius of Warren K. Lewis, who quickly and successfully applied the already well known scientific principles of fractional distillation on a large scale to the problems of oil distillation. The oil refiners had begun to use the continuous cracking tube still which produced a constant stream of petroleum. Lewis arranged to take these vapors up a tall properly designed column containing numerous plates where the desired separations were made, mostly by a single passage. In retrospect, it may appear to be a simple matter, but it is a fine example of the use pure science can render to industry.

While this was going on Standard Development was participating in another great application of science to gasoline. Tetraethyl lead was discovered by Midgely of General Motors, who found that infinitesimal amounts of it would overcome the phenomenon of knock in the operation of internal combustion engines. By supressing this knock the engine developed more power, and what was also of importance, a larger quantity of gasoline, treated with TEL, became available for use as automobile fuel. But there was no known way of making TEL economically in large amounts until the laboratory workers with the help of Professor C. A. Kraus of Brown University, found how to make it from an alloy of sodium and lead treated with ethyl chloride. The ethyl chloride needed for this process is now made most economically from refinery ethylene by a process worked out by Standard Development. What TEL means to automotion in general and to military aviation in particular is too well known to need further comment.

Under Secretary of War Patterson Addressing the Forum.

Samples of Lubricating Oil for Laboratory Test.

But the problem of providing an adequate supply of high grade gasoline was not fully solved by the discovery of TEL. Its chief use is to upgrade inferior but not too low-grade base stocks. The problem was to produce more base stocks of a grade that could be brought to the required quality with one or two cubic centimeters of TEL.

At this stage the development company acquired the high pressure hydrogenation process which had been pioneered by the I. G. Farbenindustrie in Germany, and undertook to adapt that process to the American oil industry. The project was organized by a group of 19 American oil companies, which left the burden of technical development on Standard Development. This work turned out to be the first practical foundation for the development of 100-octane fuel.

By this time the year 1939 had arrived and the work of the development organization had become oriented by the military demands of the French, British and American governments, and its organization and experience became a military asset of real value. From then on the main lines of war activities of the organization were to be in the production of aviation gasoline, synthetic toluene and synthetic rubber.

In the production of aviation gasoline the original hydrogenation process was doing valiant service, but was hardly able to meet the enormous demand and was soon supplemented by two other operations: alkylation and catalytic cracking. Standard Development engineered the first commercial alkylation plant and the first plants for isomerizing normal paraffins to produce isoparaffins for alkylation purposes. The catalytic cracking process was pioneered commercially by the Houdry Company; to this basic invention the Standard organization contributed a new development in the form of "fluid catalytic cracking" which has enormously advanced the frontiers of catalytic cracking, and has provided for a greatly increased supply both of aviation gasoline and olefinic materials for synthetic rubber.

In the synthetic rubber field Standard Development is responsible for three principal contributions. As a sequel to the purchase of the hydrogenation process it acquired an interest in the Buna rubber process from the Germans, and at the outbreak of World War II, undertook an immediate development of Buna-type rubbers in the United States. Thereby was laid the foundation for a synthetic rubber industry which is now expanding to a total annual production of 900,000 tons. Development of a supply of butadiene, the principal raw material for Buna rubber, was shared with the Carbide and Carbon Chemicals Company, which undertook to develop commercially the production of butadiene from alcohol, while the Standard group led the way in development of the petroleum process. Another major contribution of the Standard investigators in the synthetic rubber field was the development of butyl rubber.

Another major contribution of this organization to the war effort has been felt in the supply of toluene for TNT, which is the basic high explosive of modern warfare. The supply of toluene from coal tar and other known sources was hopelessly inadequate to meet the enormous demand. Standard undertook to produce toluene from petroleum by a true synthetic operation, in which high yields of high purity product could be made without degradation of any important quantities of petroleum. This process was perfected and incorporated in a plant built by the Humble Oil and Refining Company at Baytown, Texas, for the Ordnance Department in 1941. This plant and its prototypes built by other refiners have supplied raw material for most of the high explosives used by the Allied forces in this war.

The foregoing outline of the activities of this distinguished research organization during the 25 years of its existence is of course incomplete, in that it touches only a few of the high points and ignores a vast amount of work that has been less spectacular in results but has been of tremendous importance as a whole. Nothing can be said now of the services which this organization has rendered as an emergency technical arm of the Army, and the Navy. About these, it is permitted to mention only the development of a large area artificial fog generator, the production of improved incendiary bombs, and a new and more effective type of flame thrower.

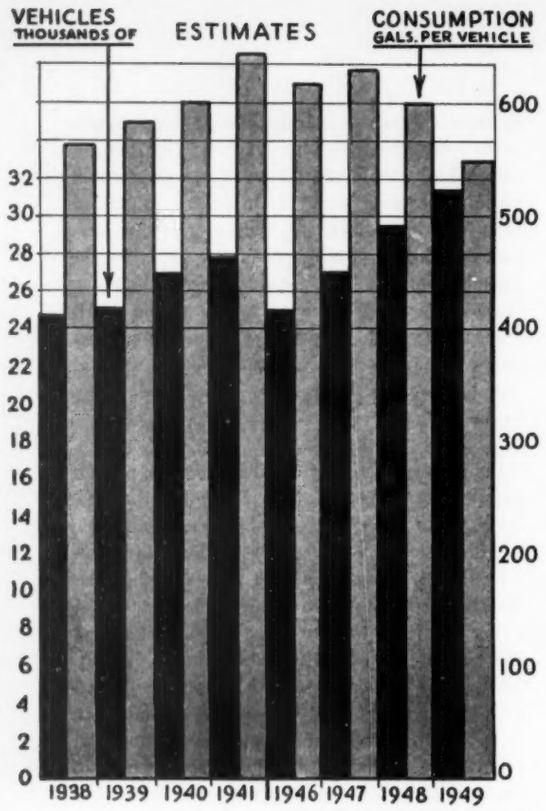
But the fact of greatest significance about the Standard Development Company is its demonstration of the worth of a comprehensively organized and fully integrated research organization. Let a body of 2000 highly qualified scientists and technicians be gathered together, inspired by the profit motive and a will to public service, and they will sooner or later uncover the means of meeting the needs of modern civilization in peace or in war.

Right: Studying Effect of Impurities on Butyl Rubber.

High Pressure Reaction Unit Used in Testing High Octane Gasoline.

Catalyst Room of Esso Laboratory; Each Bottle Represents a Separate Experiment.

Photos Courtesy Standard Oil Co. (N. J.)



PETROLEUM PRODUCTS POST WAR

By Albert J. McIntosh*

THE total demand for petroleum products in the United States in 1941 averaged about 4,066,000 barrels a day. Our forecast indicates that this former consumption may be considerably exceeded by 1946. A fairly large part of this expansion will take place in heavy fuel oils for navies and commercial vessels. It might very well be that the United States companies may not be able to supply this entire national demand at competitive prices. If so, a portion of this demand must necessarily be taken care of by imports or by ships bunkering in foreign ports. If the product is available at competitive prices, we estimate that the quantities shown could be sold.

*Economist—Socony Vacuum Oil Co.

Before the war civilians working in industry and on farms in the United States reached almost 49 million in 1941 which was higher than the figure for 1929. I expect more people to be so employed after the war even in the face of a fairly large military force. Such an employment will not eliminate all unemployment. During the reconversion period unemployment might average eight million. This, of course, would be much higher than the rest of the post war period.

The Federal Reserve Bank production index in 1941 reached 162. I expect the years 1946 through 1949 to average almost as high. This is also true for disposable income, i. e. that income paid to individuals less personal taxes

TABLE I

TREND OF MOTOR VEHICLES AND OIL BURNERS

	1938	1939	1940	1941	1946	1947	1948	1949
Passenger Cars—(*Thousands*)								
Vehicles Carried over from Previous Year	24,427	24,650	25,499	26,960	22,355	25,683	28,060	30,440
New Cars Registered	1,874	2,636	3,399	3,714	,188	5,188	5,188	3,981
Cars Scrapped or Laid Up	1,651	1,787	1,938	2,757	2,810	2,811	2,808	2,805
Vehicles Carried over to Next Year	24,650	25,499	26,960	27,917	25,683(a)	28,060	30,440	31,616
Average Vehicles in Use	24,657	25,036	26,073	27,382	24,260	27,167	29,595	31,410
Consumption Per Vehicle—Bbls. 42's	13.40	13.88	14.29	15.26	14.71	15.00	14.29	13.10
" " " —Gallons	563	583	600	641	618	630	600	550
" For Year Thous. Bbls. 42's	330,406	347,757	372,347	418,243	356,969	407,505	422,786	411,321
Memo								
Cars Registered (*Thousands*)	25,405	26,342	27,598	29,657	26,801	29,307	31,816	33,056
Population—Civilian ((*Thousands*)	129,807	130,722	131,669	130,550	135,786	137,808	139,256	140,145
Average Persons Per Car	5.11	4.96	4.77	4.40	5.07	4.73	4.37	4.23
Trucks (*Thousands*)								
Vehicles Carried over from Previous Year	4,331	4,379	4,522	4,751	4,305	4,719	5,133	5,547
New Cars Registered	365	487	576	641	792	792	792	608
Cars Scrapped	317	344	347	566	378	378	378	378
Vehicles Carried over to Next Year	4,379	4,522	4,751	4,826	4,719	5,133	5,547	5,777
Average Vehicles in Use	4,273	4,421	4,575	4,727	4,630	5,030	5,430	5,741
Consumption Per Vehicle—Bbls. 42's	26.81	27.60	28.33	30.29	29.83	30.64	30.67	29.55
" " " —Gallons	1,126	1,159	1,190	1,272	1,253	1,287	1,288	1,241
" For Year Thous. Bbls. 42's	114,531	122,035	129,598	143,070	138,129	154,132	166,517	169,631
Tractors								
Average Tractors in Use (*Thousands*)	1,577	1,653	1,763	1,693	2,262	2,354	2,445	2,537
Gasoline								
Consumption Per Vehicle—Bbls. 42's	15.48	15.48	15.43	15.43	15.48	15.48	15.48	15.48
" " " —Gallons	650	650	648	648	650	650	650	650
" For Year Thous. Bbls. 42's	24,410	25,583	27,195	26,104	35,009	36,425	37,842	39,258
Kerosene & Distillate Consumption:								
Consumption Per Vehicle—Bbls. 42's	8.33	8.29	8.29	8.33	8.33	8.33	8.33	8.33
" " " —Gallons	350	348	348	350	350	350	350	350
" For Year Thous. Bbls. 42's	13.144	13,705	14,605	14,118	18,851	19,614	20,376	21,139
Distillate Heating Oils—								
Burners:								
Burners Carried over from Previous Year	1,510,733	1,658,103	1,856,233	2,113,433	2,439,335	2,768,233	3,077,608	3,396,170
New Burners Sold	179,360	236,140	302,210	333,250	312,668	364,745	380,092	311,690
Burners Scrapped or Converted	31,990	38,010	45,010	50,080	16,230(b)	55,370	61,530	67,900
Burners Carried over to Next Year	1,658,103	1,856,233	2,113,433	2,396,603	2,768,233	3,077,608	3,396,170	3,639,960
Average Burners in Use	1,578,108	1,748,944	1,974,232	2,243,352	2,592,845	2,910,159	3,223,581	3,507,161
Consumption Per Burner—Bbls. 42's	56.70	57.77	56.43	56.76	51.76	51.18	50.09	48.61
" " " —Gallons	2,381	2,426	2,370	2,384	2,174	2,150	2,104	2,042
" For Year Thous. Bbls. 42's	89,471	101,034	111,406	127,340	134,193	148.937	161,472	170,479
Ave. No. Non-Farm Structures—Occupied	20,531,950	21,186,900	21,774,000	22,287,250	23,848,100	24,465,200	25,274,750	26,179,150
" " " " —Built	391,000	474,900	532,300	602,200	580,300	773,900	967,200	967,600
Burners Sold to Structures—Occupied	146,360	192,737	243,151	252,270	238,655	251,048	234,486	186,101
" " " —Built	33,000	43,403	59,059	80,980	74,013	113,697	145,606	125,589

(a) 1946 includes 950 (000) reregistered laid-up cars. The cars carried over from 1945 also includes reregistration of laid-up cars.

(b) Increase due to conversion back to oil.

paid out. The total for 1941 was $83.7 billions while my forecast for the four post war years averages almost as high. This implies good conditions of employment, production and income for several years following the end of the war. The pent-up unsatisfied demands of 135,000,000 people and the demands of war-torn and war-starved countries abroad should provide the outlet for these products.

Gasoline demands in the United States are based upon several considerations. The most obvious is the number of cars in use. This involves the number of cars to be manufactured, cars to be scrapped, the efficiency of new engines, the number of cars to be brought out of storage, average mileage used, prices of gasoline, disposable income, population shifts and of course, tires. In our studies, tractors, trucks, buses, aviation and miscellaneous uses were each dealt with separately and in detail. The results are shown on accompanying graph and Tables I and II.

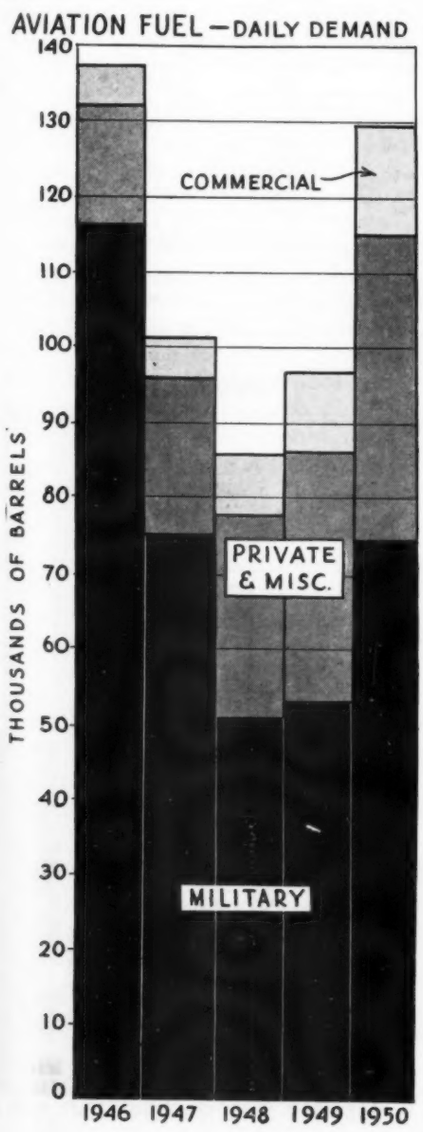
It is interesting to note that passenger car gasoline reached a peak of 1,146,000 barrels a day in 1941 and I expect that in the post war period that passenger cars will consume only about this same quantity in 1948 and then again it may drop off if better, more efficient cars come on the market in 1947. We expect trucks, buses and tractors to use more and more gasoline as these markets continue to expand as in the past.

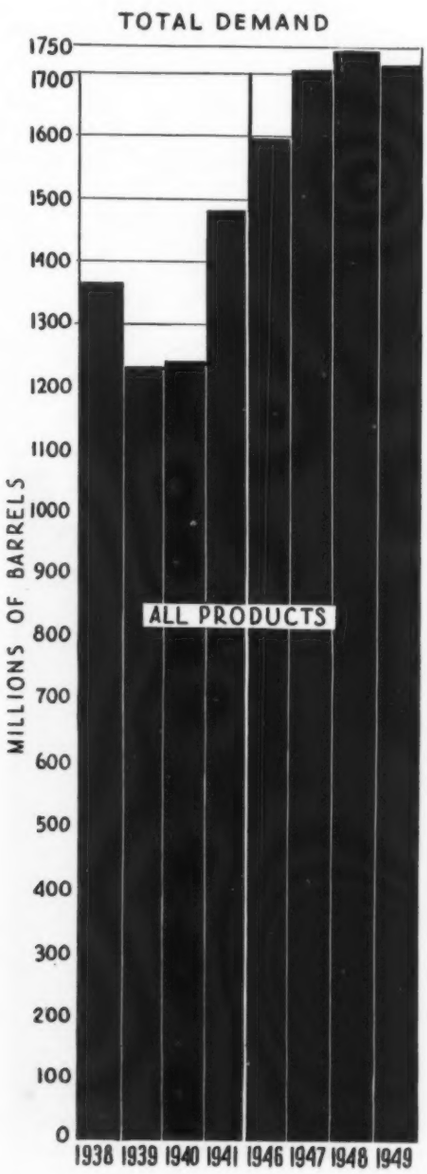
Demand for aviation fuel contains two contrasting components: (1) Military requirements which obviously are most difficult to foretell and (2) commercial and passenger plane use which may be expected to increase rather rapidly. The following tabulation attempts an approximation of the course of domestic demand extended to 1950. Exports are not included although it is probable that a substantial export demand for this grade of gasoline will develop. The figures given under "International Services" are only those for the fueling of planes leaving the continental United States. It may be mentioned that lubricants required for planes will amount to approximately two percent of the volume of gasoline.

Although the utilization of air transport, both for passengers and cargo, may be expected to grow rapidly after the return of peace, we can reasonably anticipate, as late as 1950, the use of only about 30 percent of the present total production of aviation fuels. All in all, the gasoline market will expand, I believe, but its expansion will not depend so largely as in the past on passenger vehicles.

Domestic Demand for Aviation Fuels
Daily Requirements in Bbl. of 42 Gal.

	1946	1947	1948	1949	1950
Domestic, Mainliners	12,800	16,800	21,700	27,400	33,700
Domestic, Feeder Lines	600	1,320	2,180	2,300	2,800
Domestic, Commercial (Cargo & Mail)	2,030	2,380	2,800	3,150	3,500
Private Flying	2,100	2,650	4,100	6,000	10,300
Engine Building	1,900	1,900	1,900	1,900	1,900
International Services	1,520	1,740	2,130	2,840	3,440
Total Excluding Military	20,950	26,790	34,810	43,590	55,640
Military	117,000	75,000	51,000	53,500	74,300
Grand Total	137,950	101,790	85,810	97,090	129,940





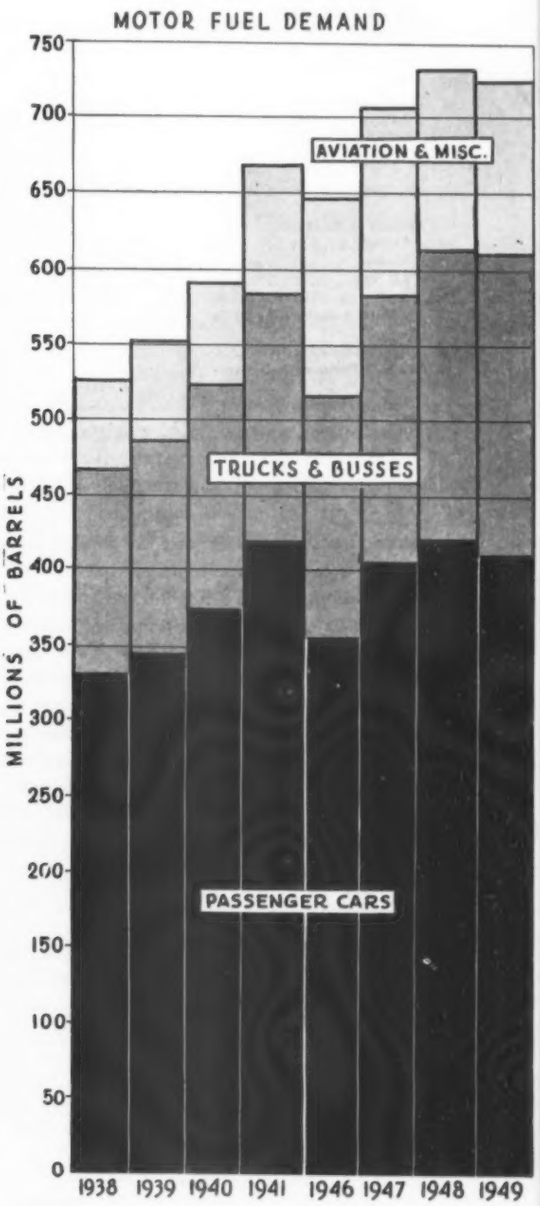


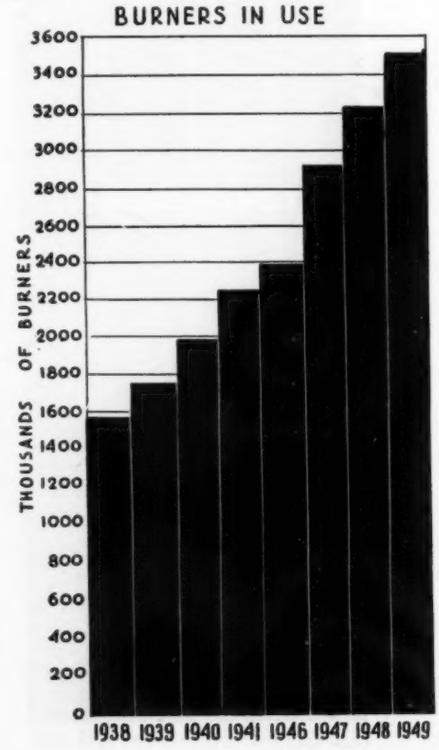
TABLE II

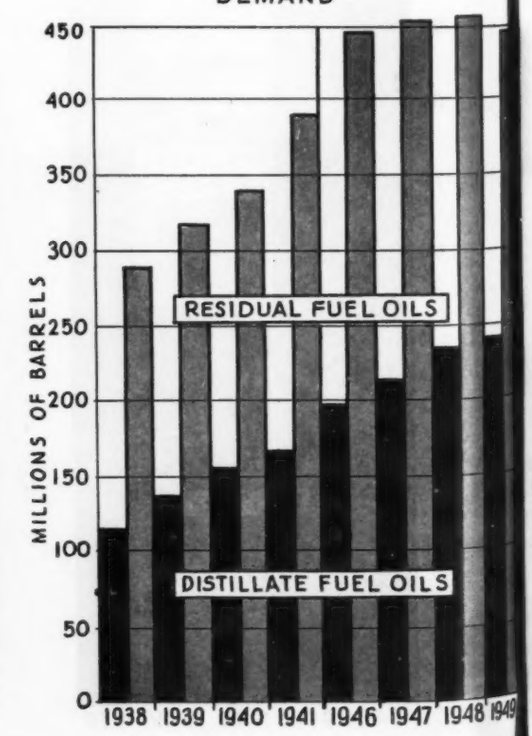
TREND OF DOMESTIC DEMAND FOR PETROLEUM PRODUCTS

Thousands Barrels (42 Gals.)

	1938	1939	1940	1941	1946	1947	1948	1949
Motor Fuel								
Passenger Cars	330,406	347,757	372,347	418,243	356,969	407,505	422,786	411,321
Trucks	114,531	122,035	129,598	143,070	138,129	154,132	166,517	169,631
Busses	16,000	16,845	17,256	19,038	19,832	21,662	22,681	22,751
Total Automotive	460,937	486,637	519,201	580,351	514,930	583,299	611,984	603,703
Tractors	24,410	25,583	27,195	26,104	35,009	36,425	37,842	39,258
Aviation	2,403	3,740	5,475	10,950	50,400	37,200	31,400	35,400
Miscellaneous	35,253	36,597	37,553	49,998	46,965	51,123	51,123	47,376
Total Motor Fuel	523,003	552,557	589,424	667,403	647,304	708,047	732,349	725,737
Kerosene								
Range Oil	33,707	37,061	44,692	46,110	49,600	50,800	51,800	49,000
Tractors	3,955	4,346	4,683	4,467	4,700	5,200	5,300	5,200
All Others	20,810	21,580	22,264	22,868	23,600	24,600	25,000	23,400
Total Kerosene	58,472	62,987	71,639	73,445	77,900	80,600	82,100	77,600
Distillate Fuel Oils								
Heating	82,388	97,131	115,533	120,908	134,193	148,937	161,472	170,479
Diesel:								
Vessels	13,088	14,108	12,979	10,571	12,958	14,382	15,665	17,375
Army-Navy	643	1,078	1,115	3,537	5,877	5,001	5,014	5,081
All Other	7,473	8,681	10,575	13,243	20,331	22,083	23,937	24,674
Total Diesel	21,204	23,867	24,669	27,351	39,166	41,466	44,616	47,050
All Other	10,947	14,527	16,473	20,631	23,500	26,290	27,170	22,680
Total Distillates	114,539	135,525	156,675	168,890	196,859	216,693	233,258	240,209
Residual Fuel Oils								
Heating	35,935	39,101	44,846	46,606	55,520	61,143	65,453	69,718
Vessels	61,178	65,146	61,554	56,678	103,676	96,085	93,023	92,500
Army-Navy	10,974	11,159	15,781	25,938	40,515	30,845	30,928	30,845
Gas & Electric Plants	27,733	27,908	28,234	38,774	35,691	38,179	39,750	41,286
All Other	154,589	175,289	187,691	212,994	210,028	225,394	228,564	210,149
Total Residual	290,409	318,603	338,106	380,990	445,430	451,646	457,718	444,498
Lubricants & Wax								
Automotive, Aviation, etc.	12,089	12,263	12,886	14,110	14,813	15,951	16,292	16,212
Industrial	10,811	13,340	13,681	18,607	17,420	19,099	19,602	17,001
Marine	215	274	325	476	377	357	337	337
Total Lubricants & Wax*	23,115	25,877	26,892	33,193	32,610	35,407	36,231	33,550
Asphalt & Road Oils								
Paving	23,769	24,626	26,467	31,825	38,904	41,179	37,659	30,157
Roofing	6,509	7,447	6,886	9,844	9,000	9,500	10,000	10,000
All Other	1,979	2,463	2,156	2,796	2,540	2,840	2,920	2,460
Total Asphalt & Road Oils	32,257	34,536	35,509	44,465	50,444	53,519	50,579	42,617
Miscellaneous Products	72,600	77,380	84,715	102,679	125,819	134,607	131,122	124,053
Crude & Refinery Loss, etc.	23,061	23,983	24,046	12,800	22,500	22,500	22,500	22,500
Total Domestic Demand*	1,137,456	1,231,448	1,327,006	1,483,865	1,598,866	1,703,019	1,745,857	1,710,764

*Includes Non-Petroleum Additives Used in Compounding Lubricants.





In connection with the forecast for gasoline consumption, it must be remembered that in 1941 we were using about 27,400,000 passenger cars on an average and during next year we may use only around 22,000,000. In New York state alone passenger cars in use before the war were about 2,350,000 and last year they decreased to 1,900,000 with a further decline in prospect for 1944 and 1945. It will require a couple of years to make up this shortage of vehicles. Some auto manufacturers may get back into production within three months after V-E day but others may require much longer. Return to peak production may be delayed for over a year.

Availability of tires has limited the use of passenger cars but the principal shortage has been

(*Continued on page 96*)

POST WAR POSITION OF ALCOHOL

Is Subject Of Tariff Commission Study

Greater Economy of Oil as Source of Materials for Synthetic Rubber Will Exclude Employment of Grain for Industrial Alcohol Unless Government Policy Forces Use — Competition of Natural Rubber More Likely to Limit Utilization of Petroleum Products.

THE United States Tariff Commission, in execution of a request from Congress, has concluded an investigation on how the domestic industrial alcohol industry of this country has been affected by the war, what changes and new developments have taken place during the war, and what will be its probable post-war status with respect to foreign trade and international competition.

The alcohol industry has two points of contact with the petroleum industry. Wherein petroleum and alcohol are competitive or at least alternative raw materials, and the other is in the motor fuel business, wherein attempts have been made from time to time to require the admixture of alcohol with commercial gasoline.

Surveying the prewar status of industrial alcohol the Commission finds that in 1939 the United States was consuming about 103 million gallons, of which two-thirds was obtained from molasses, about one-fourth by chemical synthesis from such gases as carbon monoxide, hydrogen, acetylene and ethylene (the latter a by-product of petroleum refining) and the rest (about 10 percent) from grain. When the war broke out the production of alcohol was vastly increased, and the production in 1944 is likely to reach nearly 600 million gallons, of which probably two-thirds or more will be derived from grain.

The major cause of this enormous expansion is the large use of alcohol in the manufacture of synthetic rubber; about half of the Buna-S (the principal type) synthetic rubber output in 1944 will be made from alcohol; in the latter part of 1943 it was accounting for about three-fourths of the butadiene production that was going into synthetic rubber. In addition to the use of alcohol in making smokeless powder and various materials for civilian consumption, large amounts of it are needed for lend-lease.

The war-time status of the alcohol industry, therefore, is that of a business that has swollen to six times its peace-time dimensions. In order to promote this expansion the government has rendered substantial assistance, amounting to some millions of dollars. However, the total investment by the government in the alcohol industry has been relatively small compared with the investment by private industry; in this respect it differs from many other industries that are engaged in making war-time products. A lively question then is what is to become of this excess productive capacity of the alcohol industry in the post-war period?

There are two possibilities. The whisky distillers will have no reconversion problems and will almost certainly return to their former vocation; the other producers will scrap their excess equipment and retrench their operations to the point where they can meet the normal post-war requirements for alcohol, which are expected to average about 110 million gallons yearly. Or, the synthetic rubber industry, which is now largely owned by the government, may be continued more or less indefinitely after the war; government operation of the industry with alcohol serving as a main raw material, has been urged as an outlet for farm products. With the same idea of helping agriculture, it is proposed to partially supplant gasoline with alcohol as a motor fuel. This can be brought about only through mandatory legislation and attempts to force such action have been unsuccessful.

As regards the future of the synthetic rubber industry in the United States, the Tariff Commission divides the problem into two parts: (1) how much synthetic rubber will be produced? and (2) what proportion will be based on alcohol? The reasoning is as follows:

(1) The total capacity of the synthetic-rubber plants already built or nearing completion is expected to be about 800,000 tons. The largest pre-war consumption of rubber (both natural and synthetic, but not including reclaimed rubber) was 786,000 tons in 1941, a figure considerably larger than in any other pre-war year. It is probable that fairly soon after the close of the war with Japan, southeastern Asia, formerly the dominant source of U. S. rubber supplies, will again be in a position to produce and export quantities of natural rubber.

The relationship between domestic production of synthetic rubber and importation of natural rubber after the war may, of course, depend solely on natural competitive forces, but on the other hand it may be affected by government action in the form of duties, quotas, or subsidies. If only natural competitive forces operated, the quantity of synthetic rubber produced in the United States might be relatively small, and confined to a few types which are superior to natural rubber for certain purposes. At the other extreme, the government might take such action as would result in the complete utilization of the synthetic rubber plants which have been built during the war.

(2) The second problem mentioned above is even more difficult. For any given total output of synthetic rubber in the United States after the war, what proportion would be made by the alcohol process?

As bearing on this question, it should be noted (a) that of the total capacity of the synthetic-rubber plants, about one-eighth will be for the manufacture of rubber not requiring butadiene and styrene as materials; and (b) that as regards the capacity, 700,000 tons, for the manufacture of Buna-S rubber, in which these materials are used, about half will probably use the alcohol process in making butadiene and styrene, the remainder of these materials to be supplied by direct production from petroleum.

The relative use, after the war, of alcohol and of petroleum for the manufacture of synthetic rubber may, of course, depend solely on natural competitive forces. However, the matter may be largely determined by decisions of the government, which owns nearly all the synthetic rubber plants and can utilize them as it sees fit.

The effect of different possible decisions on this subject upon the quantity of alcohol used in rubber after the war may be best understood by illustrations. For example, says the Commission, it might be decided to use the entire capacity of the alcohol-rubber plants, whether or not the entire capacity of the petroleum-rubber plants is utilized. The capacity of the alcohol-rubber plants may be about 350,000 tons annually. Their full use may call for about 330 million gallons of alcohol per year. If the requirements of alcohol for normal uses are approximately the same after the war as before it (averaging 110 million gallons annually), the total consumption of alcohol under these conditions would probably be about 440 million gallons per year. Again, the decision might be to utilize half of the capacity of the alcohol-rubber plants, whatever, if any, reduction might be made in use of the petroleum process. In that case the capacity utilized for the alcohol process may require an annual quantity of about 165 million gallons of alcohol. The total consumption of alcohol, including that for "normal" uses, would thus probably be about 275 million gallons per year. Similarly, if one-fourth of the capacity of the alcohol-rubber plants were used, this may require about 83 million gallons of alcohol annually for rubber, with a probable total consumption for all purposes of about 193 million gallons. Finally, of course, the government might decide to discontinue the alcohol process altogether, using only petroleum as material for such quantities of rubber as it might decide to produce.

The question of the relative utilization of alcohol and petroleum for rubber, the Commission points out may be influenced by the consideration that reserves of petroleum are limited. Conceivably, with a view to conserving petroleum, the government might adopt a policy of reducing the use of the petroleum-rubber plants to a minimum.

This could be done by limiting the total quantity of synthetic rubber produced. Or it could be accomplished by a shaft from the petroleum process to the alcohol process, such a shift requiring considerable additional investment of capital. It is important to note however that use of petroleum as the material for a relatively large output of synthetic rubber would be only a very minor item in the total requirements for petroleum. If all the projected output of Buns-S rubber (700,000 tons) should be made by the petroleum process, the amount of petroleum consumed would probably be less than one percent of the present rate of production.

On the other side, suggestions have been made that alcohol might be used to a considerable extent as a motor fuel in the United States. Various bills have been introduced into Congress requiring the admixture of alcohol with gasoline for use in motors. In recent years such a requirement has been in effect in a number of foreign countries, in all of which, however, conditions differ greatly from those in the United States, particularly in that they import the major part of their gasoline.

The quantities of alcohol required to replace any considerable proportion of the gasoline now used in the United States would be enormous. This is evident from the statistics. The consumption of gasoline in this country in 1939 was about 23 billion gallons. If only 5 percent of that quantity had been replaced by alcohol, more than a billion gallons of alcohol would have been required, or about ten times as much as the total actual consumption of alcohol at that time. If, however, as much as, say, one-fifth of the gasoline had been replaced by alcohol, which would have meant from 4 to 5 billion gallons of alcohol, the conservation of petroleum would have been of significant proportions.

The Tariff Commission recognizes that, apart from decisions taken by the government on grounds of public policy, the future of alcohol and petroleum in relation to the synthetic rubber industry will be governed by cost factors, but in making its report the Commission refrains from consideration of costs. This vital angle of the matter is treated at some length in a special report of the Rubber Director on the Synthetic Rubber Program as of August 31, 1944. In this report, the opinion is expressed that the world demand for rubber after the war will be far greater than the capacity of the world's plantations before the war. If that is so, then even if the plantations resumed production on the full prewar scale, the synthetic rubber plants would have to be continued in operation at least to an extent that would make up the deficiency. The retiring Rubber Director, Bradley Dewey "cannot conceive" under any circumstances of anyone scrapping the low-cost producers of the synthetic rubber program, because the presumptive post-war demand will absorb at least the output of the low-cost producers (amounting to 400,000 to 600,000 short tons), plus all the natural rubber that the existing plantations can produce.

The Special Report of the Office of Rubber Director gives a breakdown of current costs of producing butadiene, styrene and copolymer in the accompanying table, together with an estimate of their probable post-war levels.

TABLE I

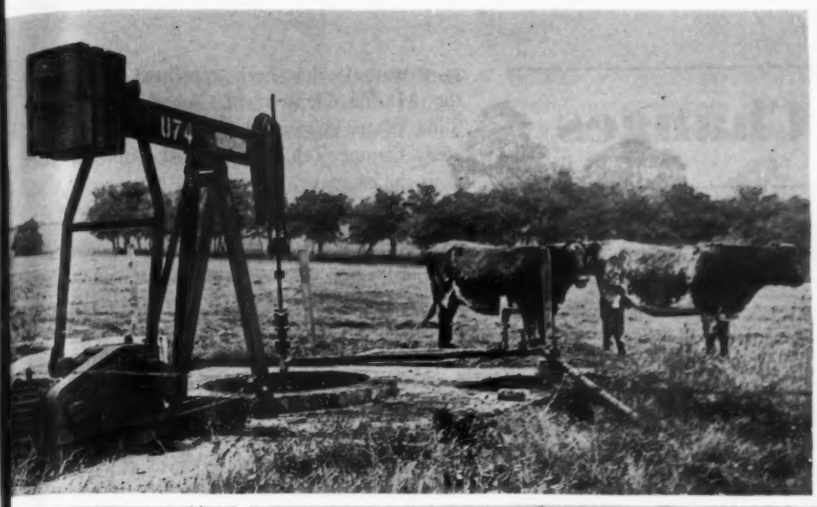
SYNTHETIC RUBBER PLANT OPERATING COSTS

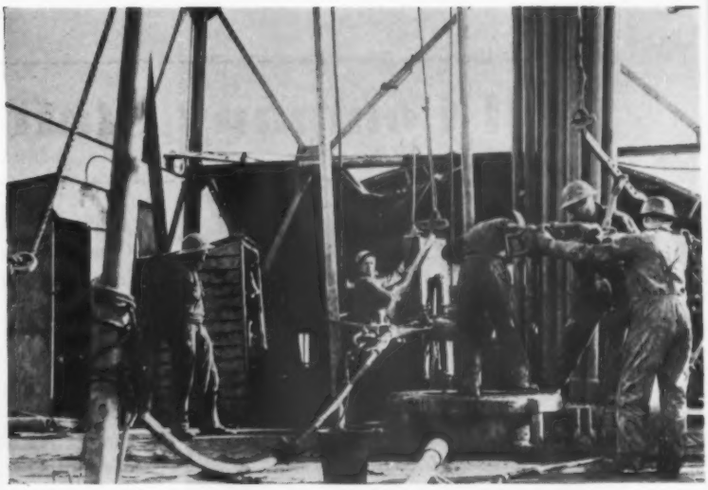
(Cents per pound of product, excluding feedstocks, amortization, preliminary expense, research)

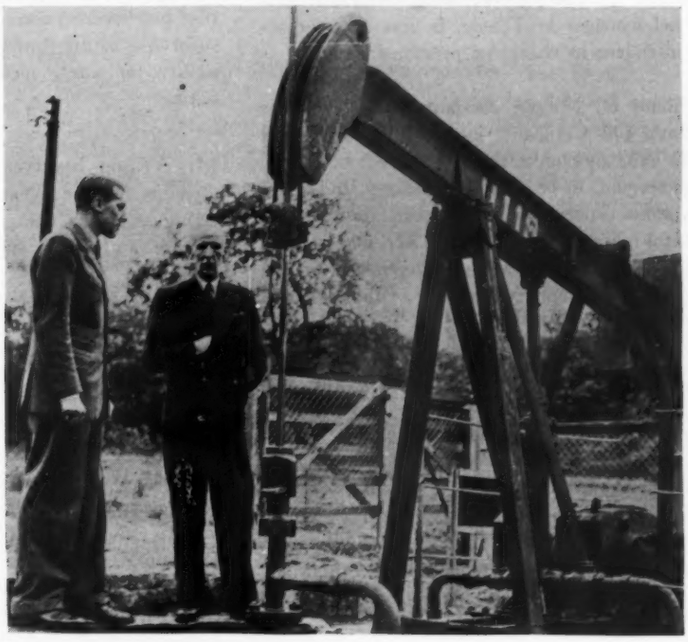
ITEMS	BUTADIENE From alcohol		BUTADIENE From butylene (dehydrogenation)		STYRENE		COPOLYMER	
	Present	Post-War	Present	Post-War	Present	Post-War	Present	Post-War
1. Chemicals (excluding feedstocks)	0.18	0.13	0.57	0.50	0.42	0.42	2.10	1.90
2. Utilities	.95	.75	1.20	1.20	.46	.46	.26	.26
3. Other costs:	.14	.12	.48	.44	.27	.25	.52	.45
(a) Operating labor	.02	.02	.07	.07	.06	.06	.05	.05
(b) Supervision	.19	.30	.62	.60	.23	.30	.40	.40
(c) Repairs and Maintenance	.04	.03	.15	.15	.01	.01	.02	.02
(d) Operating supplies	.04	.03	.25	.25	.05	.05	.10	.10
(e) Laboratory	.01	.01	.02	.02	.01	.01	.33	.25
(f) Packaging and shipping			.20	.20				
(g) Plant overhead			.20	.20	.16	.15	.33	.30
(1) Salaries, wages	.02	.02	.06	.06	.03	.03	.03	.03
(2) Insurance	.02	.02	.01	.01	.01	.01	.08	.08
(3) Taxes	.32	.27	.15	.15	.27	.27	.09	.09
(4) Miscellaneous								
Sub-total other costs	.80	.82	2.21	2.15	1.10	1.14	1.95	1.77
4. Royalties and management	.51	.63	.65	.63	.68	.63	.52	.51
Total	2.44	2.33	4.63	4.48	2.66	2.65	4.83	4.44
5. By-product credit	-.23	-.14			-.14	-.14		
Total out-of-pocket	2.21	2.19	4.63	4.48	2.52	2.51	4.83	4.44

"These costs" it is stated," exclude the cost of the principal monomers, butadiene and styrene. It will be noted that the postwar estimate is approximately 0.4c per pound less than the present average. This is largely because of a reduction in the cost of chemicals other than monomers which enter into the polymerization formula. The remainder represents estimated possible savings in operating labor i. e., changes in the packaging end of the plants, and other minor cost reductions. The cost of the Buna-S as a function of the butadiene and styrene cost is presented as a nomograph from which it can be seen that Buna-S can now be produced for an out-of-pocket cost of about 12.2c per pound with styrene and butadiene at 7c and 8c per pound respectively. (These are the approximate out-of-pocket charges for the present low cost monomer producers). If the butadiene is made from alcohol at present prices, the out-of-pocket cost for Buna-S is approximately 37c per pound. On a postwar basis it has been indicated that it should be possible to produce butadiene and styrene at out-of-pocket costs of not over 7c and 5c per pound, respectively. These prices should make it possible to produce Buna-S at an out-of-pocket cost of 10.7c per pound. Even if the butadiene cost were 9c per pound, as might be realized by the alcohol process, the direct cost of Buna-S would be only 12.1c per pound. In all of the above costs, nominal management fees and royalties as listed only are included. The additional selling expenses, provisions for profit, interest charges on the use of private operating capital, increased royalties and market risks may well increase the cost of both the monomers and the Buna-S itself, probably not less than 2c per pound nor more than 4c per pound."

The competitive aspects of the situation appear to warrant the following statements: At the present time butadiene from alcohol costs approximately five times as much as butadiene from the low cost butylene dehydrogenation. The cost of butadiene from alcohol will continue to be high as long as the price of alcohol is based largely on the cost of grain. If, in the post-war period, sufficient alcohol can be obtained synthetically from petroleum or from molasses or other low cost agricultural products, this cost differential will close rapidly and the two processes would be competitive, if the prices of alcohol and butylene were approximately 9½c and 6c per gallon, respectively, or 15c and 13½c, respectively. These prices of alcohol are somewhat less than are generally estimated for the postwar market and on the basis of the present calculations it appears that the butylene and butane dehydrogenation plants will be the low cost butadiene producers. However, an improvement in the Carbide and Carbon process resulting in a higher yield of butadiene from a given quantity of alcohol or recovery of certain by-products which at the present time are credited at fuel value would make the picture for alcohol butadiene more favorable.



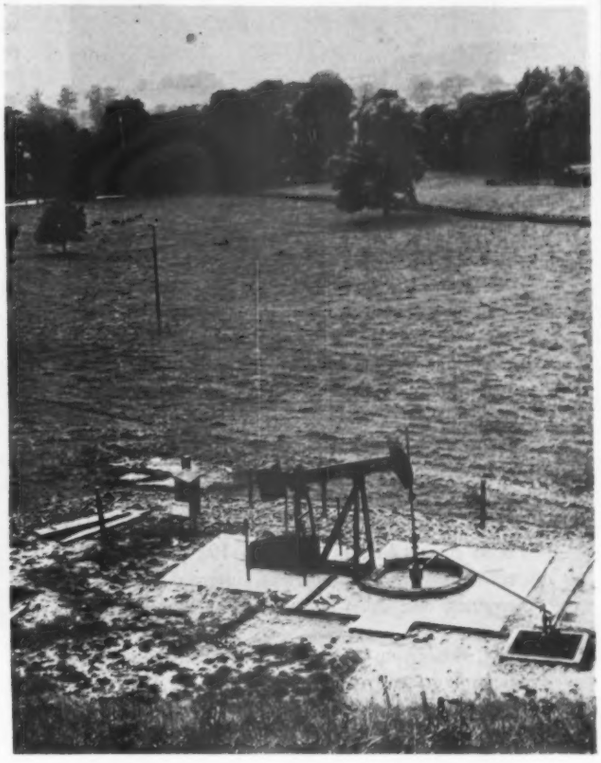




Above: Hon. Geoffrey Lloyd, Chairman of Oil Control Board and Sir William Fraser of Anglo-Iranian, Inspect Pumping Well.

Left: Derricks Remain Only During Drilling Program.

Top Left:Oil Production in a Bucolic Setting.



Inconspicuous Pumps Work Well Sites.

Top Right: Drilling Britain's Deepest Well (74,000 ft.)

BRITISH OIL PRODUCTION

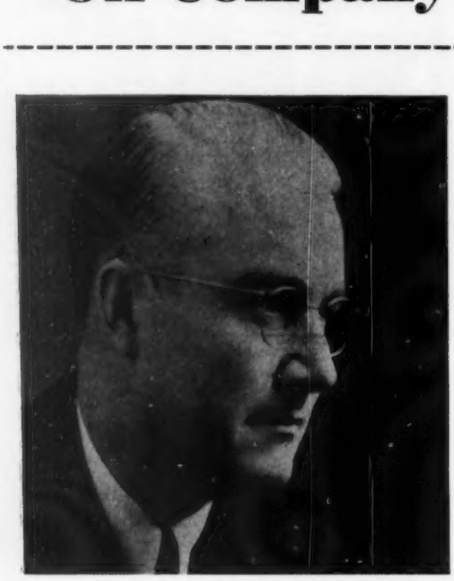
BACK in 1939, before the start of World War II, preparations were made to undertake a systematic search for oil in the United Kingdom. Several oil companies obtained drilling rights, surveys were made and a number of exploratory wells were put down in areas that appeared to promise possible production.

After hostilities began this work was continued with the added stimulus provided by the threat to Britain's overseas supply arising from the Nazi U-boat attack. A veil of secrecy was spread over the operations, however, and though it was known in oil industry circles that a modest but valuable production from indigenous sources was being developed, no details as to its location or extent were allowed in print.

This strict censorship still applies so far as the location of wells is concerned but in mid-September the authorities lifted the veil to the extent of announcing that oil was being produced at the rate of 100,000 tons or something more than three-quarters of a million barrels per year. They also permitted press representatives to visit a field containing over 200 wells and allowed photographs to be made which are reproduced on this page.

As these illustrations reveal a British oil field presents something of a contrast to such fields in other parts of the world. To preserve local amenities regulations require that derricks be removed as soon as wells are completed, that oil be conveyed from the well to gathering points by underground pipes and that no unsightly structures, slush pits or similar defacements be permitted to remain. As a consequence the field in operation has an attractive, almost park-like appearance.

Oil Company Staff Changes



Hallam Hans Anderson

HALLAM HANS ANDERSON, vice president and general manager of Shell Pipe Line Corp., Houston, Texas, has been appointed national vice chairman of the American Petroleum Institute's Committee on the Standardization of Oil-Country Tubular Goods and a member of its Engineers' Subcommittee, it has been announced by the Institute's Division of Production. Mr. Anderson returned to API standardization work after an absence of 15 years, previously having been active during the years 1925-1929 in the standardization of derricks, internal-combustion engines, and other oil-field equipment.

Mr. Anderson was born 52 years ago in Portland, Ore., and was graduated by the University of California in 1915, with a B.S. in electrical engineering, and in 1916 he received his A.M. from the same university. He was formerly a member of the American Institute of Electrical Engineers, and of the American Society of Mechanical Engineers—in 1928 having been chairman of its Los Angeles section.

BARRY F. MEGLAUGHLIN, formerly manager of publications of Esso Marketers, has been appointed assistant on public relations to A. Clarke Bedford, general sales manager. Mr. Meglaughlin joined the company in 1934.

ARTHUR E. PEW, JR., Vice President, Sun Oil Company, has announced the following changes in organization in the Manufacturing Department: G. E. Chew who has been personnel manager at Marcus Hook becomes assistant superintendent of the refinery in charge of personnel division. H. E. Lawton, assistant manager in the personnel division, is made personnel manager; C. H. Abbott who previously served as the office manager at the Toledo refinery is appointed assistant manager; E. P. King, heretofore personnel manager at Toledo, is now assistant superintendent in charge of personnel division.

William D. Mason, assistant to the president of Sun Oil Company, in charge of Industrial Relations, announces the appointment of W. E. Zimmerman, to be assistant manager, Industrial Relations department, with headquarters in the general offices in Philadelphia. Mr. Zimmerman previously was assistant superintendent of the Marcus Hook refinery in charge of the personnel division.

LEO D. WELCH, a vice president of the National City Bank of New York, became treasurer of Standard Oil Company (New Jersey) on October 16. Mr. Welch, who has had 25 years of experience in foreign banking, succeeds J. E. Crane, who was recently elected a director of the company. Mr. Crane will continue to supervise the company's financial operations, as well as the comptroller's and tax departments.

Mr. Welch joined National City in 1919 after graduation from the University of Rochester and began his duties at the Buenos Aires branch. Later he was manager and supervisor in Chile and in 1934 returned to Buenos Aires as supervisor of the River Plate branches. He was made a vice president in 1943 and was assigned to the Overseas Division with headquarters in New York.

He is a former director of the Central Banks of Argentina and Chile, and former president of the American Chamber of Commerce in Buenos Aires and the Argentine Trade Corporation. He was born in Rochester on April 22, 1898.

H. J. WILSON has been appointed manager of the Marine Department, Associated Division, Tide Water Associated Oil Company. He succeeds George Zeh, who retired after 42 years with the company.

Mr. Wilson has held a variety of executive positions since joining Tide Water Associated Oil in 1919. He began in the construction department during the first major enlargement of Avon Refinery to provide facilities for manufacturing lubricating oils. Continuing in the Engineering Department, he became district engineer for the San Joaquin Valley, and in 1923 was brought into the home office at San Francisco as assistant superintendent of sales construction and maintenance. In 1925 he was made supervisor of fire protection and in 1929 responsibility for safety measures was added to his duties.

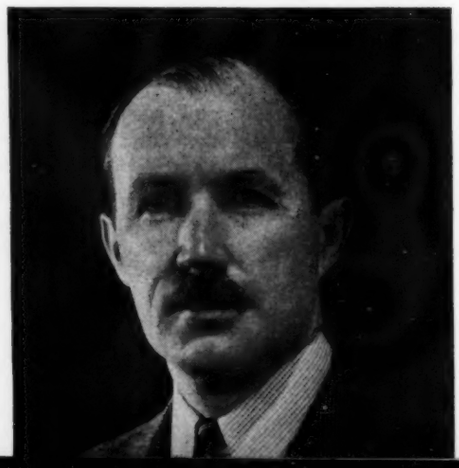
Mr. Wilson has been coordinator of defense activities for Tide Water Associated since 1941, acting as liaison with Army, Navy and civilian defense authorities and cooperating with the Petroleum Administration for War on safety measures. He has been active as a member of the Petroleum Industry War Council in the organization of Pacific Coast committees for the protection of petroleum facilities.

U. B. BOUCKE, vice-president and controller of Tide Water Associated Oil Company, has been elected to the board of directors according to announcement released by President William F. Humphrey. Mr. Boucke, connected with Tide Water Associated for more than twenty-three years, was elected to fill the vacancy created by the resignation of George J. Hanks.

CLARENCE S. BEESEMYER has been elected president of Gilmore Oil Company, succeeding Earl B. Gilmore who retired for reasons of health. Mr. Beesemyer is one of the best known oil executives on the Pacific Coast. He started with the Gilmore Company in 1912 as a laborer and rose through various positions to become a vice president and director before his accession to the presidency. He has been prominent in the war activities of the industry as a member of the Petroleum Industry War Council, a member of the PAW general committee for District 5 and chairman of the sub-committee on marketing.

Barry F. Meglaughlin

Leo D. Welch



Clarence S. Bessemyer

HOWARD P. HOLMES, newly elected president of the American Association of Oilwell Drilling Contractors, was born in Portland, Indiana, in 1902, and got his high school education there. He received a B. A. degree from DePauw University in 1925 and was made a Phi Beta Kappa that year. After attending Harvard Law School for one year he came to Texas and was with Continental Supply Company until 1935, except for one year with Shell Oil Company. He was in various West Texas fields from 1926 until 1931, and in East Texas in 1931, coming to Dallas at the end of that year to become resident manager for Continental. He remained in that capacity until 1935, when he went into business for himself as a drilling contractor. He has been an officer or director of American Association of Oilwell Drilling Contractors continuously since 1941.

SAMUEL B. ECKERT, vice president, Sun Oil Company, announced the following changes within the company's marketing department.

R. H. Anders is appointed assistant general manager, industrial products division, with headquarters in Philadelphia. S. W. Craig, industrial products representative at Allentown, Pa. is appointed manager of the Philadelphia industrial products division, the post previously held by Mr. Anders.

William E. Allen has been appointed acting district manager of the Dayton, Ohio district. William E. Randolph succeeds Mr. Allen as motor products manager in the Cleveland, Ohio district.

A. G. ANDERSON has been made general traffic manager of Socony-Vacuum Oil Company, succeeding the late L. H. Benner.

George E. Maxwell, Winthrop P. Moore and H. L. Newton have been added to the staff of the marine sales department. Mr. Maxwell is manager of the small craft division, Mr. Moore is in charge of sales promotion and Mr. Newton is marketing assistant.

WILLIAM HENRY DAVIS has been appointed process engineer, engineering division, manufacturing department of the Sun Oil Company. Mr. Davis formerly was eastern representative of Bechtel-McCone Corporation, Los Angeles, with headquarters in Philadelphia.

JAMES P. NEILL who has been superintendent of pipe lines for the Southern Natural Gas Company for the past eight years has accepted the position of general superintendent of the pipeline construction division of H. C. Price Company with headquarters in Bartlesville, Okla.

A. Clarke Bedford

A. CLARKE BEDFORD, vice president in charge of sales, has been elected executive vice president of the Standard Oil Company of New Jersey.

STEWART S. KURTZ, JR., manager of the experimental division of Sun Oil Co., Philadelphia was elected chairman of the Division of Petroleum Chemistry of the American Chemical Society at its 108th meeting held in New York, September 12-15. He has been active in petroleum development and experimental work for the Sun Oil Co. since 1936.

Foreign Oil Legion

CARL ST. JOHN BREMNER, widely known petroleum geologist, met death in an airplane crash out of Lima, Peru, on September 18. He was chief geologist of the California Ecuador Petroleum Company, subsidiary of Standard Oil Company of California. Born in San Francisco in 1895 Mr. Bremner graduated from the University of California in 1921. After a post graduate course in geology he joined Standard of California in 1923 and has been active in their geological work in foreign fields since that time.

The accompanying illustration shows the field headquarters of Y-force Operations Staff, somewhere in Southwestern China. The officer in charge is First Lieutenant Edward M. Tenney, Jr. of Baltimore, Md. whose duties are those of purchasing and contracting officer. Lieut. Tenney gained the experience that fits him for this exacting task during six years spent in China in the marketing division of Standard Vacuum Oil Company and later while managing his own firm engaged in the importation of Chinese jewelry to the United States.

Joining the Army as a private in 1942 Tenney was assigned to an Officers' Candidate School and then went to the Field Artillery School at Fort Sill, Okla. From there he was sent to India and thence transferred over the "Hump" to China in November 1943.

Among the guests of Los Angeles NOMADS at their September meeting were (left to right) S. L. Slaughter, with International Petroleum Co., at Negritos, Peru; L. A. Sweeny, formerly with Attock Oil Company in the Punjab, India, now a member of the International outfit in Peru; H. C. Snyder of American-Arabian who has been spending a vacation in the United States; F. R. Wilmer who recently left for Trinidad in the service of Caribbean Petroleum Company.

★ ★ ECHOES FROM THE WASHINGTON OIL FRONT ★ ★

By W. J. Maddox, Chief of World Petroleum's Washington Bureau

Price Increase Revived

Rep. Wright Patman

AFTER letting it rest in a pigeonhole for more than a year and a half, the House Small Business Committee dragged out its recommendation for a flat, over-all 35 cents a barrel boost in crude oil prices, has dusted it off and presented it to Economic Stabilizer Fred Vinson with a request for an immediate "yes". The committee assured Vinson that the price increase is as urgently needed today as it was back in the early days of 1943, when the committee suddenly got hot on the subject and then dropped it. Vinson let the committee know that he would give the recommendation careful consideration—a safe pre-election gesture, but only the most sanguine look for anything but the same adverse decision that was given the 5-cent increase proposal submitted earlier which d to the stripper well subsidy.

The Committee, which is headed by Representative Wright Patman of Texas, suggested that refiners who could not absorb the increase might draw on the government for the difference in cost to prevent a boost in consumer prices for refined products. The congressmen urged the increase "because the plight of the independent oil producer is a deplorable one and because he will be forced out of business, leaving the field entirely to the majors and to those concerns using excess profits from unrelated businesses."

Refinery Construction

MATERIALS may not be available for some time, but at least WPB is on notice that United States oil companies are ready to spend some $352,944,000 on domestic and foreign refining facilities as soon as controls are sufficiently relaxed. Of this amount, $176,789,385 is planned for refinery construction in this country and $176,155,000 for foreign construction, which will include five new refineries as well as additional facilities. These figures exclude any estimate for rebuilding or rehabilitating facilities in areas now occupied by the enemy.

Industry's construction intentions were canvassed by PAW back in May in a request for an outline of projects it wished to undertake as soon as possible on the basis of no government assistance other than priority help. Replies indicated that there was a tremendous back-log of planned construction, falling into three general groups: (1) New facilities to replace equipment that has been subject to excessive depreciation because it has been operated at high rates and under severe conditions during the war, (2) New facilities required because of obsolescence resulting from the rapid progess in refinery technology during the war, (3) New facilities to permit greater yields of desirable high quality products from a given volume of crude and to make possible use of what are now considered less desirable crudes to achieve this end.

WPB'S announced plan for relaxation of material controls will presumably make available additional steel for pipes and raw materials for the fabrication many items for production of crude and natural gas. Also, when controls are relaxed materials and parts will become available for necessary improvements in distributing facilities. However, in refining the problem is different, and additional action will be required to free the needed materials.

Mental Reconversion

Bill Boyd

PIWC Chairman Bill Boyd sees no great problem ahead in physically reconverting the oil industry to a peacetime tempo, but the mental reconversion—readjusting the industry's thinking and retooling its business methods from war to peace—"may well engage the careful attention of us all". He puts reliance in meeting this, however, on American alertness and initiative that built the petroleum industry in this country to a position far in advance of that of any other nation.

"It is a matter of utmost importance," Boyd says, "that we be prepared to go ahead full throttle as soon as the exigencies of war permit. We must restore at the earliest possible moment balanced production of crude oil from existing fields. Present maximum production is necessary as a war measure, but the return of peace will bring with it the necessity of not only revising our rates of production so that the greatest ultimate yield rather than the highest current production will be obtained, but the need to replace our war-depleted reserves by a great exploratory campaign must also be one of our very first objectives. "Crude oil has been the very keystone of our great arch of oil supremacy and barring the discovery of abundant new sources of mobile energy, will be even more vital to our national survival if war comes again." The PIWC Chairman predicts that new products, new outlets, new uses, and new concepts of service will provide more jobs and more opportunities in the petroleum industry, and will also provide even greater peacetime usefulness for the industry.

Transportation Chairman

Bert I. Graves

BERT I. GRAVES, vice president of Tide Water Associated Oil Company has been appointed chairman of the East Coast Supply and Transportation Committee, according to an announcement by Petroleum Administrator Ickes. Mr. Graves fills the post vacated by W. Alton Jones when the latter was made chairman of the General Industry Committee. Mr. Graves has been active in the important work of handling supplies of crude and products to the Atlantic Coast since the beginning of the war. He organized and headed the special committee that developed and put in operation the plan for pooling extra freight costs involved in the handling of supplies overland after the withdrawal of tankers and had a prominent part in the development of the "Big Inch" and "Little Big Inch" pipe lines.

PAW Cutback

PAW is not waiting for the end of the war to begin reducing its staff, according to Deputy Petroleum Administrator Ralph Davies, who says on the basis of present operations the agency will be able to turn back some $700,000 of its appropriation to the Treasury at the end of the current fiscal year. Last May PAW voluntarily reduced its budget about $500,000. Operating on an annual budget of $6,000,000, PAW expenditures for the first three months were $1,317,213, or $182,787 under the amount allowed for the period.

The current saving, Davies points out, does not reflect any cuts anticipated as possible after the termination of the war in Europe. In all, it has been possible to reduce the PAW staff from a high of 1,438 persons in July 1943 to 1,156 as of the end of September 1944—a cut of 20 percent.

Long run proves plant

THE world's smallest commercial fluid catalyst cracking unit has made good in its initial run on synthetic catalyst, which went 65 days without a stop

It is a part of the Frontier Refining Company's new aviation gasoline refinery in Cheyenne, Wyoming

During the run the plant produced its quota of aviation gasoline, fully meeting the rigid specifications of the Army and Navy

The starting date was May 30 On August 3 the plant was shut down for inspection It was in good condition and could have run longer This unit is now on its second successful run

Universal designed the facilities in the Frontier refinery, which is one of the scores of U. O. P.-designed war plants that are contributing substantially to the aviation gasoline supply—or are nearing completion

CATALYTIC CRACKING	HYDROFORMING
CATALYTIC REFORMING	DEHYDROGENATION
HYDROGENATION	POLYMERIZATION
ALKYLATION	RETREATING
ISOMERIZATION	POLYTREATING
THERMAL CRACKING	U. O. P. CATALYSTS
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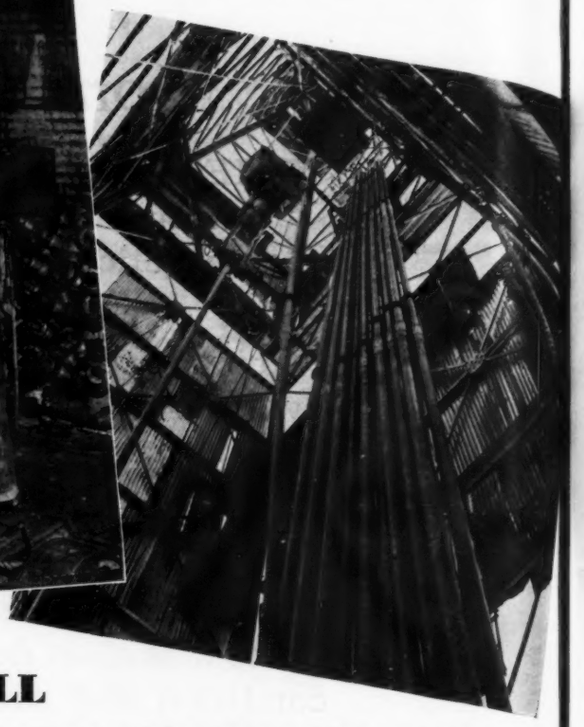
Petroleum Process Pioneers
For All Refiners

The Refiners Institute of Petroleum Technology

Left: Drilling KCL 20-13 Kern County, Calif.

Below: Stacking Pipe from New Deep Well.



CALIFORNIA WELL SETS DEPTH RECORD

Derrick Over World's Deepest Well.

MOVING quietly forward during the past fourteen months a Standard of California crew in the Coles Levee field of Kern County has been driving the drill deeper and deeper below the earth's surface. Deep wells are no novelty in California and KCL 20-13 attracted little notice until it was announced late in September that it had surpassed the previous depth record for the state, the 15,004 feet reached by Continental Oil Company's KCL-A2 in the Wasco field. This feat was accomplished back in 1938 and stood as a world's record until earlier this year when the Phillips Company's Ada L. Price No. 1, in Pecos County, Texas, set a new mark of 15,279 feet.

Having passed the 15,000-ft. level and being still favored with a green light from the company, the crew then set out to establish a new world record and to bring the prize recently yielded to Texas back to the Pacific Coast. Since that time each day's progress has been watched with keen interest throughout the state and the suppressed excitement among the crew rose almost to the bursting point as the drill ground nearer and nearer to the first extra foot that would mark the deepest penetration ever attained.

This point was reached on October 17 when it was announced amid general jubilation that a depth of 15,319 feet had been attained, nearly 300 feet below the furtherest level reached by KCL-A2 and forty feet greater than Price No. 1. This is just another milestone in the record of this well and does not mark the completion of drilling to which no fixed limit has been set.

KCL 20-13 is a part of Standard's intensive program to develop new production for war needs. While the well has not yet produced, drilling is going ahead to explore the deeper zone possibilities. Wells in this general area produce from the Stevens zone sands (Miocene) at approximately 9,000 feet. Below the Stevens, geologists are seeking other zones such as the Vedder sand which is productive at much shallower depths along the east side of the San Joaquin Valley. If the well were productive in its lower measures the discovery would be one of the most important exploration developments in recent California oil history.

The well is located approximately three-quarters of a mile to the west of the productive limits of the South Coles Levee field. Specifically, it is 332.77 feet south and 329.44 feet east of the west quarter corner of Section 5; Township 31, south; Range 25 east, M.D.B.&M. Ground level elevation is 488 feet and at that point one may look over Buena Vista Lake, the lowest spot in Kern County.

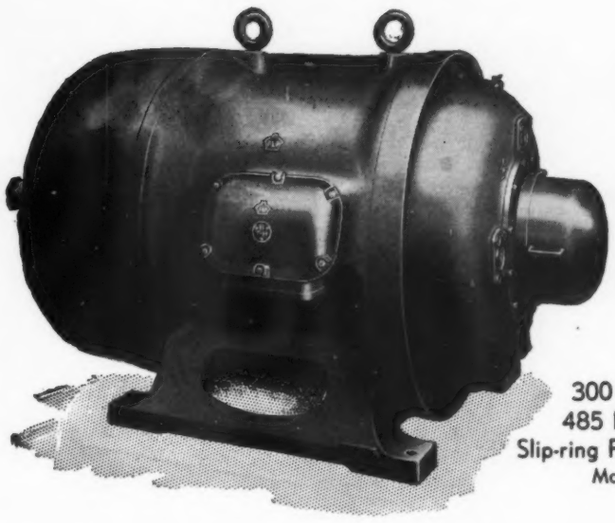
KCL 20-13 was spudded in on July 31, 1943. Almost fourteen months later, September 29, 1944, the then existing state record depth was equalled and passed. Drilling and coring have continued since that date. At the outset a 15½" hole was drilled to 1188; a 10-5/8" hole was carried to 10,999; from the latter point to 15,065, a 5⅞" hole has been drilled. Three and one-half inch drill pipe is being used at the present time. Frequent checks have shown that at no time has the hole been more than three degrees off vertical. Two strings of casing are cemented in the hole; 11¾" is cemented at 1188; and a 7" string is cemented at 10,999.

The drilling operation is particularly significant because no special equipment is being used. As a matter of fact, heavier equipment has been utilized for drilling shallower holes in the San Joaquin Valley. A partial list of equipment includes a 136-foot steel derrick, 360-ton crown block, 18" x 8" x 20" mud pump, a 16¼" x 7¾" x 20" mud pump, a 14" x 14" twin engine, an 11" x 11" twin engine, and a complete shut off gate and blow out preventer. The mud weight has been increased from the range of 78 to 80 pounds in the shallower depths to 90-93 pounds in the 15,000 ft. depths. When changing bits the crew makes a round trip in a little less than eight hours. Approximately three and one-half hours are required to come out of the hole and about four hours to go back in. Anyone with oil field experience will appreciate the handling of more than 165 ninety foot stands of drill pipe. Up to October 12, a total of 548 bits had been used. It is estimated that the total weight of the drill pipe and accessory equipment, which is supported by the derrick, approximates 250,000 pounds.

ELECTRICAL EQUIPMENT

for the

PETROLEUM INDUSTRY



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Engine-driven Generators;
Motor-generators; Switchgear;
Motors and Control Gear for all duties
in oil fields, pipe-lines and refineries.

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CROWN HOUSE, ALDWYCH, LONDON, W.C.2.

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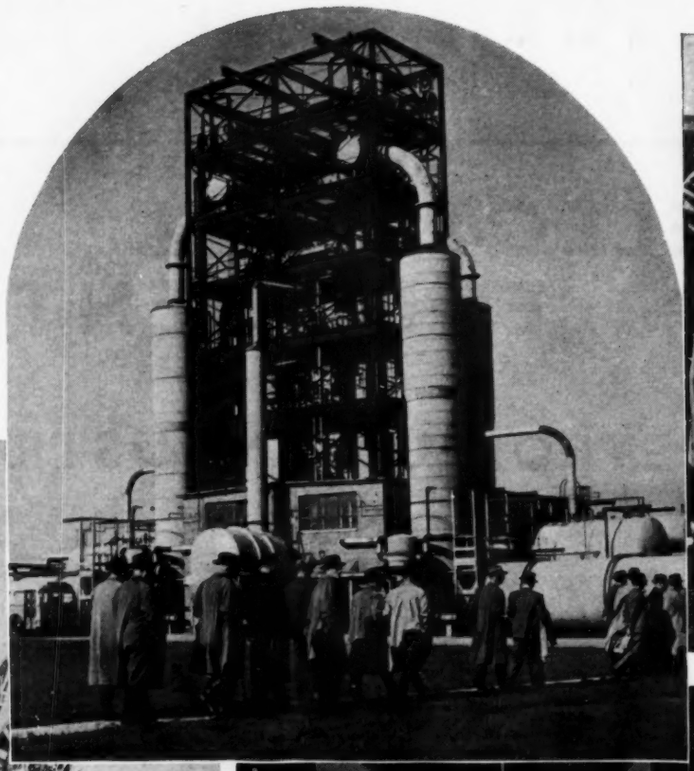
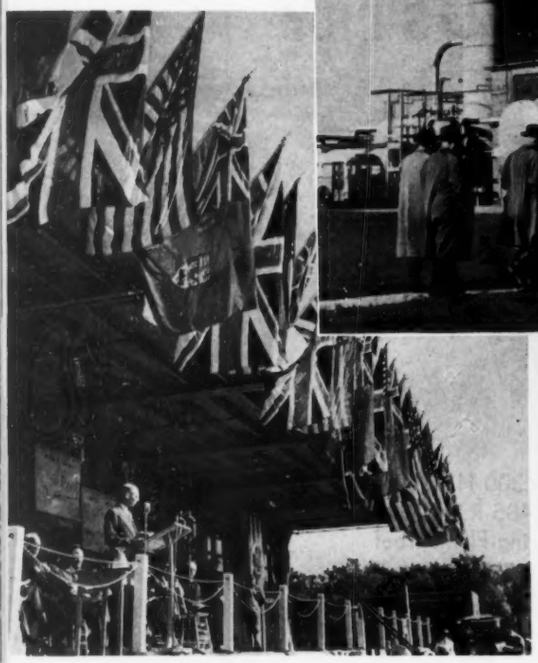
Upper Right: R. C. Berkinshaw and C. D. Howe, Examine Huge Military Tire of Synthetic Rubber.

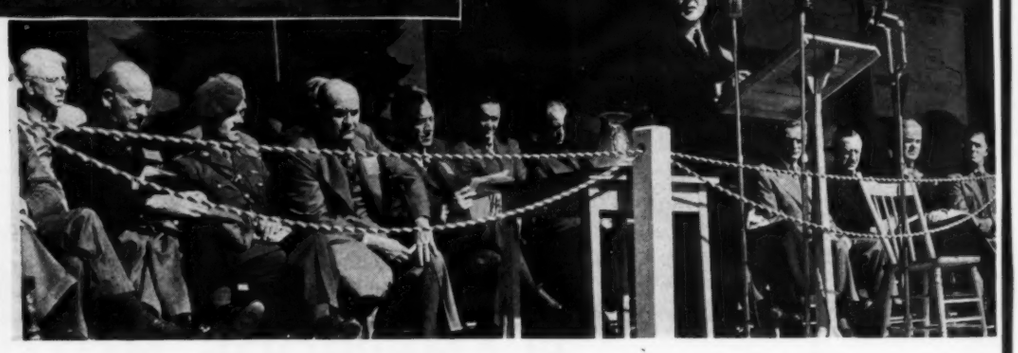
Right: One of the Cracking Towers at the Polymer Plant.

Lower Right: Hon. C. D. Howe, Minister of Munitions and Supply was Presented the 60th Millionth Pound of Synthetic Rubber at Polymer's First Birthday Celebration.

Below: R. C. Berkinshaw, President of Polymer Corporation Addressing Guests During Ceremonies.







CANADA'S GREAT POLYMER PLANT COMPLETES FIRST YEAR OF OPERATION

ON September 29 the synthetic rubber plant of the Polymer Corporation (owned by the Canadian government and operated by St. Clair Processing Corp. Ltd., a subsidiary of Imperial Oil Ltd.) at Polymer, near Sarnia, Ont., celebrated its first anniversary as a producer of synthetic rubber. During the first year of its operation this plant, built at a cost of $51,000,000 and employing some 1865 workers of all classifications, has turned out 60,000,000 pounds of synthetic Buna-S and butyl rubbers, equivalent to the output of 14,400,000 natural rubber trees covering 120,000 acres in the South Pacific, which would have to be served by 144,000 native tappers; two thirds of this amount of rubber was turned out in the last six months. Present production is at the rate of 87,000,000 lbs. per annum. Starting from scratch, the entire plant was built in 20 months, three months ahead of what was regarded as an impossible time limit.

The plant, which is located close to the Sarnia refinery of Imperial Oil Company, is completely integrated for the production of all components of Buna-S and butyl rubbers, and for their copolymerization, except for the catalytic cracking unit which is on the refinery premises.

The materials entering into the composition of synthetic rubbers in this plant are produced by the supersuspensoid cracking process, which is not yet used anywhere else on the American continent. This process consists in mixing the oil to be cracked with a clay catalyst; the mixture is then pumped through cracking coils, and the cracked products and the catalyst are separated later.

The Supersuspensoid Cracking Coil is an ingenious adaptation of the more or less standard refinery thermal cracking unit. This type of unit was developed by Imperial Oil Limited. The coil, which operates in conjunction with four similar but smaller coils already in operation at Sarnia, is located in the heart of the refinery and not on the 185-acre Polymer site. The four existing coils had to be revamped for more severe cracking conditions and an additional unit installed to supplement their operations to produce feed stocks needed for the amount of rubber to be produced.

The development of supersuspensoid cracking was of material assistance in getting the plant into operation with a minimum of delay. It also enabled the Polymer management to effect substantial savings in construction costs. The development was in successful operation at Sarnia before synthetic rubber production was contemplated.

It was entirely the work of the Research and Development Division of Imperial Oil under the direction of Dr. R. K. Stratford. The so-called suspensoid cracking operations could produce twice as many of the necessary butylenes as standard thermal cracking units of the same capacities. The flexibility of this operation was such that, with certain modifications to the existing units and by the installation of some additional capacity, it was possible to supply the proposed rubber project with the requisite amount of feed stock. This eliminated the necessity of installing a large and expensive catalytic cracking unit.

The five coils operate as a unit to crack naphtha and gas oil. Pipes from the coils convey to Polymer 6,255 barrels a day of light end liquid petroleum and 19.4 million cubic feet per day of petroleum gases (designed capacity). This light

(*Continued on page* 92)

PUTTING THE PROVE IN IMPROVEMENTS

• *This bucking bronco is a "Caterpillar" Diesel D2 Tractor taking one of the many "hurdles" designed to test its toughness on the "Caterpillar" Proving Grounds.*

• *A "Caterpillar" Diesel D4 Tractor pulling a drawbar dynamometer and loading car to test the pulling power of a certain grouser design in various kinds of soil surfaces.*

IF YOU'RE a long-standing "Caterpillar" Diesel user, you know that changes and improvements go into "Caterpillar" Diesel products the minute they're ready and right. There's no waiting for "yearly models."

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WORLD PETROLEUM ABSTRACTS

Summaries of the Most Important Articles as Published in the Oil Press of the World Dealing with Technical and Economic Aspects of the Petroleum Industry—Edited by Dr. O. W. Willcox.

GEOLOGY

Should "Water-Drive" Be Redefined? — David Donoghue, in BULLETIN ASSOCIATION PETROLEUM GEOLOGISTS, Vol. 28 (1944) No. 7, pp. 1032-1035.

The classic view that artesion or hydrostatic flow is the force behind water drive in oil reservoirs has lately had to compete with the theory that the driving pressure is supplied by expansion of the reservoir water and the compaction of the sand formation. The author adduces the following reasoning in support of the expansion-compaction theory.

1. In the East Texas basin for a distance of 30 miles, north, west, and south from the edge of the East Texas oil field the Woodbine formation has an average thickness of 500 feet, of which 50 percent is sand with a porosity of 25 percent, and 50 percent is shale and clay with a porosity of 10 percent. The "effective" thickness is taken at 300 feet of Woodbine for mation containing 2,000 barrels of water per acre-foot.

2. The expansion of the Woodbine water is 1/3500 in volume per 100 pounds per square inch of pressure decline; therefore, an acre-foot of "effective" sand expels 0.57 barrel of water as a result of this expansion.

3. The compaction (decrease in porosity) of the Woodbine sand is 45/1000 of 1 percent per 100 pounds per square inch of pressure decline; therefore, an acre-foot of "effective" sand expels 0.9 barrel of water as a result of this compaction.

4. Apparently then 1.47 barrels of water move into the oil-saturated zone from the water-saturated zone from each acre-foot of "effective" sand for each 100 pounds per square inch pressure decline to which the water-saturated zone is subjected. An "effective" sand thickness of 300 feet will yield 440 barrels of water per acre or 280,000 barrels per square mile.

5. The pressure decline as of January, 1944, in the western part of the East Texas field has been approximately 550 pounds per square inch and the pressure gradient decreases westerly from the field until at some distance the pressure has not been affected by production of oil and gas in the East Texas field. The average pressure decline of 275 pounds over such area would expel 770,000 barrels of water per square mile by compaction of the sand and expansion of the water.

If the foregoing assumptions and approximations are fairly accurate it would appear that an area extending 30 miles more or less out into the basin north, west, and south from the field would yield sufficient water from the Woodbine formation alone to replace wholly or in large part the 2 billion barrels of oil and the gas and the water produced to the end of the year 1943. It should also be apparent that in the East Texas oil field, oil and gas production, reservoir-pressure decline, expansion of the gas, oil, and water, and compaction of the rocks are complementary phenomena and that "water drive", whatever it may be, needs a definition.

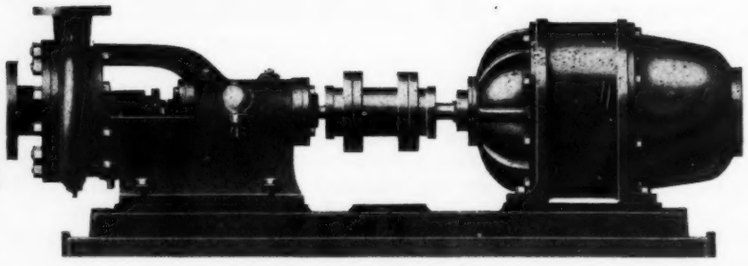
GEOPHYSICS

An Electrical Prospecting Method Used in the Gulf Coast.—E. H. Short, Jr., in OIL & GAS JOURNAL, Vol. 43 (1944), No. 10, pp. 70, 74, 77.

The new method, which is considered to offer new possibilities in geophysical exploration for oil, is based upon electrical-resistivity measurements, using low-frequency commutated currents. The effective depth of penetration of these currents depends upon their frequency.

The MODERN Process Pump
AMERICAN-MARSH PUMPS
for Fluids up to 350° F.

13
IMPORTANT CONSTRUCTION FEATURES



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Type OSCV American-Marsh process pumps are designed especially for the abnormal conditions and varied fluids encountered in the petroleum industry. Special stuffing box structure, and 12 other important construction features, make this the ideal pump for oil, propane, butane, acids, gasoline, naphtha, ammonia, organic fluids and other fluids up to 350° F. Its design is such that it can be economically furnished in special alloys. Capacities up to 1200 GPM, differential heads to 750 ft., and suction to 300 lbs.

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Their work will help petroleum serve in peace even more than it has served in war.

STANDARD OIL COMPANY (NEW JERSEY)
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Measurements made with the lower frequencies are appreciably influenced by the deeper formations, but as the frequency is increased the effects of the deeper formations become negligible, and thus the effective working depth can be controlled by maintaining the proper frequency. Shallow effects are largely eliminated by making measurements in the gap interval between successive reversals of the current, which is analogaus to suppressing the early times on a seismic record. In this way attention can be centered on particular horizons at different depths, so that various horizons can be separately examined. These selected horzions may be 800 to 1200 ft. thick. In the Gulf Coast the depths that have been tried by the method range from 3000 to 9000 ft.

The object of the method is to locate oil-bearing formations, which have a very high resistivity and theoretically it should be of value in detecting oil-filled stratigraphic traps where no detectable structure is involved. Two examples of the applicability of the method are given.

OPERATION

Reservoir Performance.—John J. Mullane, before AMERICAN PETROLEUM INSTITUTE, Div. of Production, Mid-Continent District, Tulsa, May, 1944.

The author discusses the three fundamental mechanisms by which petroleum reservoirs may be operated: gas cap drive, dissolved gas drive, and water drive. A number of examples of the application of modern engineering principles to the problems of these types is presented. Of the three methods, the gas cap drive and the water drive are preferred.

Attention has been focused recently on the return of produced water to the horizon from which it was taken. Application of this technique has already been made at East Texas, and, at the present time, application of this method is under consideration in the Magnolia Pool in Arkansas. The return of unavoidably produced water to the formation can be, under suitable circumstances, a means of reducing effective reservoir withdrawals and thus maintaining reservoir pressure, through the medium of which gas is retained in solution, high liquid saturations are maintained in the reservoir, and the flowing life of the wells is extended. The results that may be anticipated at Magnolia from this kind of control are shown. The calculated results are given for three sets of conditions: (1) if all water production is returned to the reservoir, the gas-oil ratio is maintained constant, and the production rate reduced 4% per year; (2) when all water is returned and the gas-oil ratio and producing rate are maintained constant; (3) with no return of water to the formation, maintaining the same producing rate as in 2. It is observed that the return of all produced water to the formation, coupled with moderate reductions in producing rate over a period of years, will sustain the flowing life of the wells in this pool indefinitely.

An interesting experiment along this general line is already being conducted in the Midway Pool in Arkansas, which also produces from the Smackover Lime. In this instance, fresh water is being injected into the Smackover through wells on the edge of the producing zone. This experimental project has shown some degree of success as a means of controlling the pressure behavior of the field. This project, however, is to be distinguished from that contemplated for the Magnolia Pool. In the Magnolia Pool, there already exists a substantial water drive, and the injection of water into the Smackover, in this case, is an auxiliary production control, as well as a means of disposal of salt water, whereas the Midway Pool did not have a water drive comparable in the magnitude with Magnolia, and fresh water was injected primarily to augment the water drive. The interesting feature of this experiment is the practical demonstration of the fact that it is possible to influence the behavior of the reservoir by the injection of water.

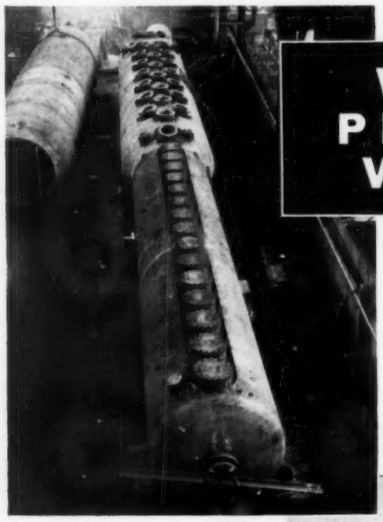
REFINING

Simplified Catalytic Cracking for the Post-War Small Refiner.—D. P. Thornton, Jr., in NATIONAL PETROLEUM NEWS, Vol. 36 (1944) No. 31, part 2, p R-489.

If the small refiner is to be able to install catalytic cracking facilities after the war there are two main conditions to be met.

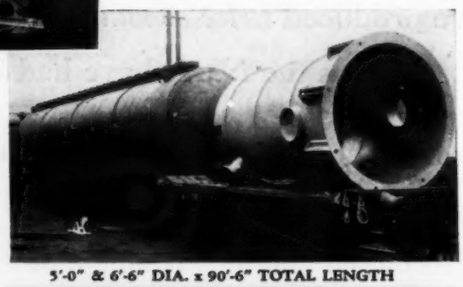
The first is that a standardized process must be available at a price the small refiner can afford to pay. By "standardized process" is meant one that has been fully developed to a point where it is not likely to be made obsolete in short order by new developments. In other words, the small refiner should not be forced into the role of a pioneer who has to bear the risks of development. Keeping in mind that the small refiner is one who, by definition, has limited capital resources, the new catalytic process offered to him must provide either for the conversion of existing thermal equipment, or else it must be of such a nature that existing thermal equipment can be economically operated in conjunction with catalytic cracking. Obviously, the average small refiner can hardly afford to scrap several hundred thousand dollars worth of functioning thermal equipment and pay out $500,000 for a brand new catalytic cracking plant.

At to the possibility of such a plant coming within reach of the small refiner, an unnamed



WELDED PRESSURE VESSELS

HYDROGEN PLANTS
as applied to
CRACKING OF PETROLEUM
HYDROGENATION
OIL SYNTHESIS



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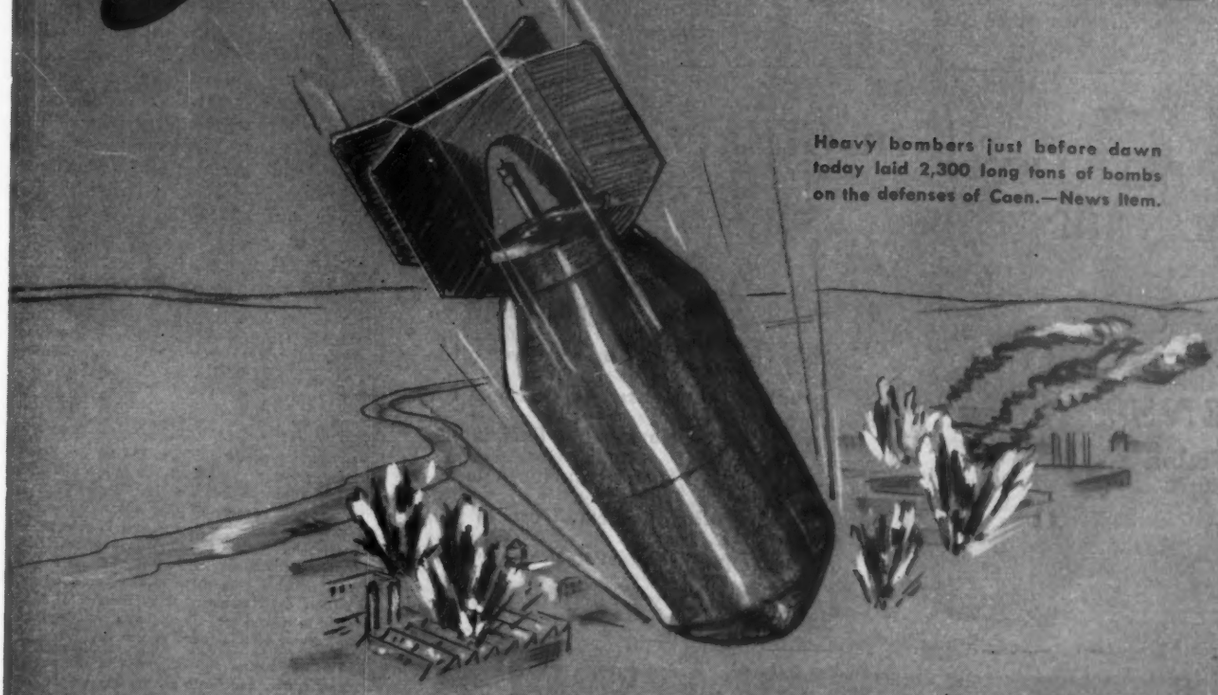

Heavy bombers just before dawn today laid 2,300 long tons of bombs on the defenses of Caen.—News Item.

• Bombs are made of metal and TNT but the force that brings them home to their targets is gasoline—three tons of it for every 1-ton bomb, according to statistics released by the petroleum industry in a current series of advertisements.

Think of this when you read that a single day's air force operations include 1000 bombers over flying-Robot installations, 1200 bombers over Germany, 1000 bombers setting out from Italy and an undisclosed number over Jap Pacific bases.

Only when you realize the enormity of the demand for fuel can you understand the importance of the portable pipelines, powered by Gaso Pumps, that carry fuel to points of use—and the urgency of conserving every drop of gasoline at home in order that there may be ample quantities for our fighting men abroad... Gaso Pump & Burner Mfg. Co., 902 East First Street, Tulsa, Oklahoma. Export Office: 149 Broadway, New York. Shreveport: W. L. Somner Co., 419 Lake Street. Los Angeles: Service Oil Field Supply Co., 5333 S. Riverside Drive.

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THE BLACK MARKET IS A PLAGUE that drains 2,500,000 gallons of gasoline a day from legitimate channels. It thrives on customers willing to sacrifice the nation's welfare to their own selfish convenience. Without such customers it would die overnight.

authority is quoted as saying that no catalytic cracking unit with a capacity of less than 5,000 bbl/day has been proven commercially feasible. This deadline, if it cannot be moved down, will shut out very many small refiners from the catalytic cracking field.

It is said that inventors, engineers and process owners are now at work trying to lower the deadline. Particular attention is being bestowed on the features that make catalytic cracking expensive to install and operate. Minimum capital cost, with use of existing thermal equipment, is taken for granted. In the matter of cost and operating expense, the short time cycles that are characteristic of most existing catalytic cracking processes should be increased to the point where the maze of automatic valves, piping and other complex equipment can be eliminated or simplified. In the regeneration of the catalyst a long regenerating cycle, with heat dissipation over a longer period of time, should promote large economies. Keeping the catalyst in motion costs money in equipment; the inventors should furnish a design in which the catalyst, neither too fine nor too course, could be used in the form of a "boiling bed" of granules that will stand wear. The catalyst should be cheap, one that does not need expensive equipment to protect it so that it will have a long life; it should be active enough to effect the required conversion of the charging oil without excessive temperatures or large reaction volumes.

A number of small refiners are known to be thinking over the problem, and for various reasons are in no great hurry to change to catalytic cracking. One reason is that for several years the great majority of cars on the road will be old ones that do not need gasoline of higher octane rating than the average small refiner is able to supply. Others are going to hold off as long as they can because they believe that radical changes in catalysts are yet to come. Others still are waiting to see whether there are likely to be developments in semi-diesel operation that will lower octane and vapor pressure requirements, and thus make catalytic cracking less necessary. In the meantime, the small refiners are contemplating such new developments as the "suspensoid process" and "cycloversion", which are said to offer prospects of hooking up with existing thermal equipment.

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Statement of the Ownership, Management, Circulation, etc., required by the Acts of Congress of August 24, 1912 and March 3, 1933, of WORLD PETROLEUM published monthly, August to June, semi-monthly in July at Orange, Conn. for October 1, 1944.

State of New York } ss.
County of New York }

Before me, a notary public in and for the State and county aforesaid, personally appeared Rex W. Wadman, who, having been duly sworn according to law, deposes and says that he is the general manager of the WORLD PETROLEUM and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation) etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Mona Palmer, Trustee under the will of Russell Palmer, 2 West 45th St., New York 19, N. Y. Editor, E. W. Mayo, 2 West 45th St., New York 19, N. Y. Business Manager, Victor N. Raiser, 2 West 45th Street, New York 19, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders, owning or holding one percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given) Mona Palmer, Trustee under the will of Russell Palmer, 2697 Tanoble Drive, Altadena, Calif.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state). None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

REX W. WADMAN
(Signature of General Manager)

Sworn to and subscribed before me this 11th day of October, 1944.

[SEAL] ELIZABETH M. DONLON
(My commission expires March 30, 1946)

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Specify Ladish *Controlled Quality* Forged Steel Pipe Fittings

Ladish forged steel fittings, carbon and alloy, are produced under exacting metallurgical control. Every Ladish fitting bears the symbol of Controlled Quality—the Ladish Heat Code.

Forged Steel Screwed Fittings

Full depth thread, accurately cut, results in pressure-tight joints. Pipe enters easily. Uniform thickness. Sizes clearly marked . . . ⅛" through 4".

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Speed up installation because deep sockets save time formerly required to cut pipe to exact length. Socket supports pipe and allows self-alignment. No machining of pipe necessary for fit. ASSURED WELDABILITY. Sizes clearly marked . . . ⅛" through 4".

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CANADA'S GREAT POLYMER PLANT

(*Continued from page 68*)

end liquid petroleum and the gases are the crude forms of the raw materials required by Polymer: isobutylene, normal butylene, ethylene and propylene. Some of the gas not employed in making rubber ingredients is burned in the plant processing furnaces, and to operate gas-engines compressors, and most of it is piped back to the Imperial Oil plant for use in refining operations. Much of the liquid petroleum is returned and is used by Imperial in its refinery for making gasoline. Some of the gas is sold to industries in southwestern Ontario.

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The cracked material is received in a light ends recovery unit in which the hydrocarbon streams are broken up into ethylene, propylene fuel gas, and a so-called butane-butylene cut containing isobutylene, normal butylene, butane and isobutane. This unit is charged daily with 19.4 million cubic feet of gas and 6,255 barrels of liquid hydrocarbons. Seven hundred barrels per day of propane and 1,500 barrels per day of recovered gasoline are returned to Imperial Oil. Fuel gas above the requirements of the Polymer process furnaces also is returned. The ethylene is piped to the styrene unit for making styrene. The propylene is piped to the cumene section for making cumene.

Isobutylene, which later forms the major constituent of butyl rubber, is one of the components of the butane-butylene cut produced by the light ends recovery unit. The isobutylene is separated in the extraction unit from the liquefied butane-butylene cut by treatment with acid in an isobutylene extraction unit.

The butylene concentration unit separates and concentrates the butylene necessary for making butadiene, one of the two chief ingredients of Buna-S. Three thousand one hundred and eighty barrels a day (designed capacity) isobutylene-free hydrocarbons from the isobutylene extraction unit are fed to the butylene concentration unit in which the normal butylenes required for butadiene are removed. The butane and iso-butane are returned to Imperial Oil. This unit has a 165 foot extraction tower. In this tower the normal butylenes are extracted from the butane-butylene cut by means of a chemical solvent.

The butadiene unit comprises two separate sections, one carrying out the dehydrogenation (removal of hydrogen from the molecule), and the other the concentration. Sixteen hundred and eighty barrels per day of normal butylenes representing the designed capacity of the unit, are fed to the butadiene unit. The dehydrogenation section is divided into two separate, identical units. The normal butylenes are mixed with high temperature steam and passed over a catalyst; in this way hydrogen is removed and butadiene produced. This is purified by selective solvent absorption in the extraction section.

The styrene unit comprises four sections, the ethyl-benzene, the cumene, the styrene cracking and the styrene finishing. Ethylene from the light ends recovery unit is piped to the ethyl-benzene-cumene building. Two and one-quarter million imperial gallons of benzene (often called benzol) are brought during the summer to Polymer by lake tanker from the coke ovens at Canada's steel city, Sault Ste. Marie, Ontario. It is stored in four huge cylinders, 40 feet high and 40 feet in diameter, having sufficient capacity for the six winter months.

(*Continued on page 94*)

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PORUS-KROME, applied by the Van der Horst process, is highly resistant to abrasion and corrosion, and "wets" with oil. Experience in thousands of engines in ships, planes, tanks, stationary and mobile power plants, buses, trucks and locomotives shows that PORUS-KROME not only multiplies cylinder and ring life, but reduces scuffing, ring feathering and risk of piston seizure.

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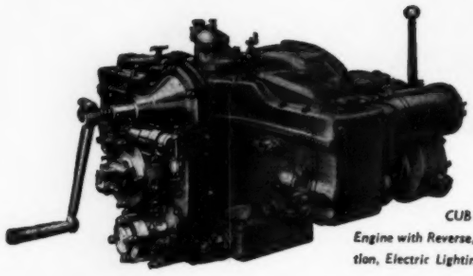
An accurate survey of a bore hole involves at least one hundred (100) or more records. The calculations to be made, based on these records, require considerable time. There is also the possibility of errors being made in such calculations, which may seriously affect the course of the hole to be determined.

To provide a speedy and accurate procedure to determine the course of a bore hole, the Sperry-Sun Well Surveying Company has prepared a set of Tables which completely eliminate the making of calculations and immediately furnish the desired results. These Tables give the results for angles of inclination in quarter degrees from 0 to 31 and in half degrees from 31 to 45 and in degrees from 45 to 55 for bearing angles in degrees ranging from 0 to 90.

To obtain the result it is only necessary to refer to the Table, select the vertical column of angle of inclination and the horizontal column of bearing and obtain the Latitude, which is the distance East or West from the vertical through the mouth of the well or from the vertical through the preceding point.

These Tables have been prepared with great effort and expense by Sperry-Sun Well Surveying Company and have been used in their organization for many years. The company has received many requests for them and on account of their usefulness to the oil industry has agreed to their publication. They can now be obtained at the price of $5.00 per copy through World Petroleum.

MARINE · STATIONARY · VEHICLE



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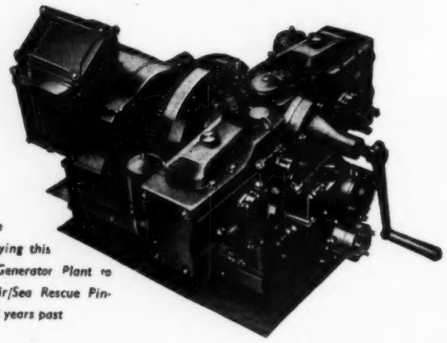

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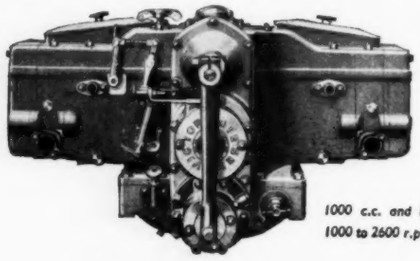

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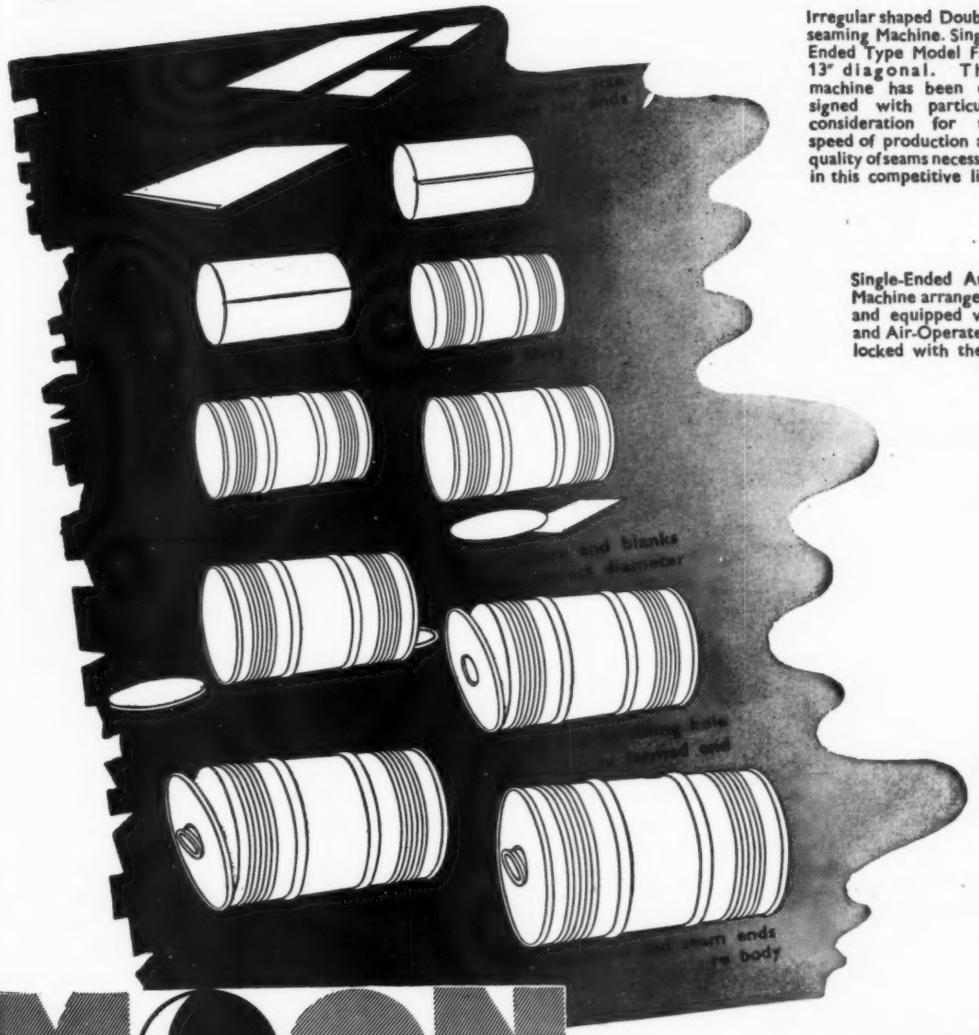
ADOPTING a program proposed by its post war planning committee, the American Gas Association will spend $1,000,000 yearly for the next three years on research, national advertising and sales promotion. Sixty percent of the appropriation will be devoted to technical and "utilization" research, while the remainder will be divided between advertising and the support of a sales promotion bureau. The advertising appropriation is in addition to $400,000 now being contributed for this purpose and $200,000 supplied by gas appliance manufacturers.

Elected To Machinery Committee

GORDON LEFEBVRE, president of the Cooper-Bessemer Corporation, Diesel engine manufacturers at Mt. Vernon, Ohio and Grove City, Pa., has been notified of his election to the executive committee of the Machinery & Allied Products Institute. Mr. LeFebvre's election was to fill one of five vacancies on the committee which is made up of executives from the country's leading machinery builders.

Gordon Lefebvre

11 to 1 — results in a winner!



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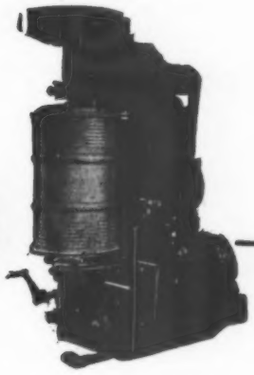

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CANADA'S GREAT POLYMER PLANT

(*Continued from page 68*)

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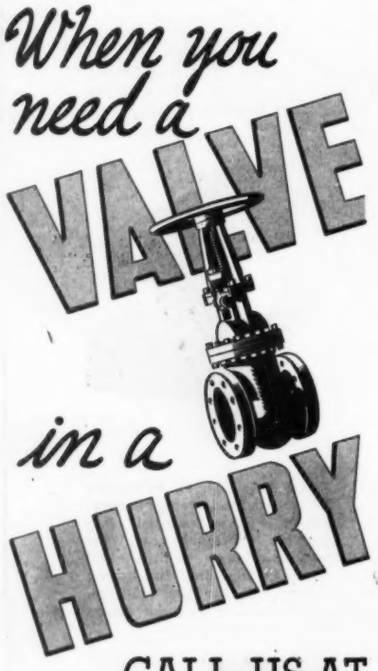
Isobutylene, which later forms the major constituent of butyl rubber, is one of the components of the butane-butylene cut produced by the light ends recovery unit. The isobutylene is separated in the extraction unit from the liquefied butane-butylene cut by treatment with acid in an isobutylene extraction unit.

The butylene concentration unit separates and concentrates the butylene necessary for making butadiene, one of the two chief ingredients of Buna-S. Three thousand one hundred and eighty barrels a day (designed capacity) isobutylene-free hydrocarbons from the isobutylene extraction unit are fed to the butylene concentration unit in which the normal butylenes required for butadiene are removed. The butane and iso-butane are returned to Imperial Oil. This unit has a 165 foot extraction tower. In this tower the normal butylenes are extracted from the butane-butylene cut by means of a chemical solvent.

The butadiene unit comprises two separate sections, one carrying out the dehydrogenation (removal of hydrogen from the molecule), and the other the concentration. Sixteen hundred and eighty barrels per day of normal butylenes representing the designed capacity of the unit, are fed to the butadiene unit. The dehydrogenation section is divided into two separate, identical units. The normal butylenes are mixed with high temperature steam and passed over a catalyst; in this way hydrogen is removed and butadiene produced. This is purified by selective solvent absorption in the extraction section.

The styrene unit comprises four sections, the ethyl-benzene, the cumene, the styrene cracking and the styrene finishing. Ethylene from the light ends recovery unit is piped to the ethyl-benzene-cumene building. Two and one-quarter million imperial gallons of benzene (often called benzol) are brought during the summer to Polymer by lake tanker from the coke ovens at Canada's steel city, Sault Ste. Marie, Ontario. It is stored in four huge cylinders, 40 feet high and 40 feet in diameter, having sufficient capacity for the six winter months.

(*Continued on page 94*)



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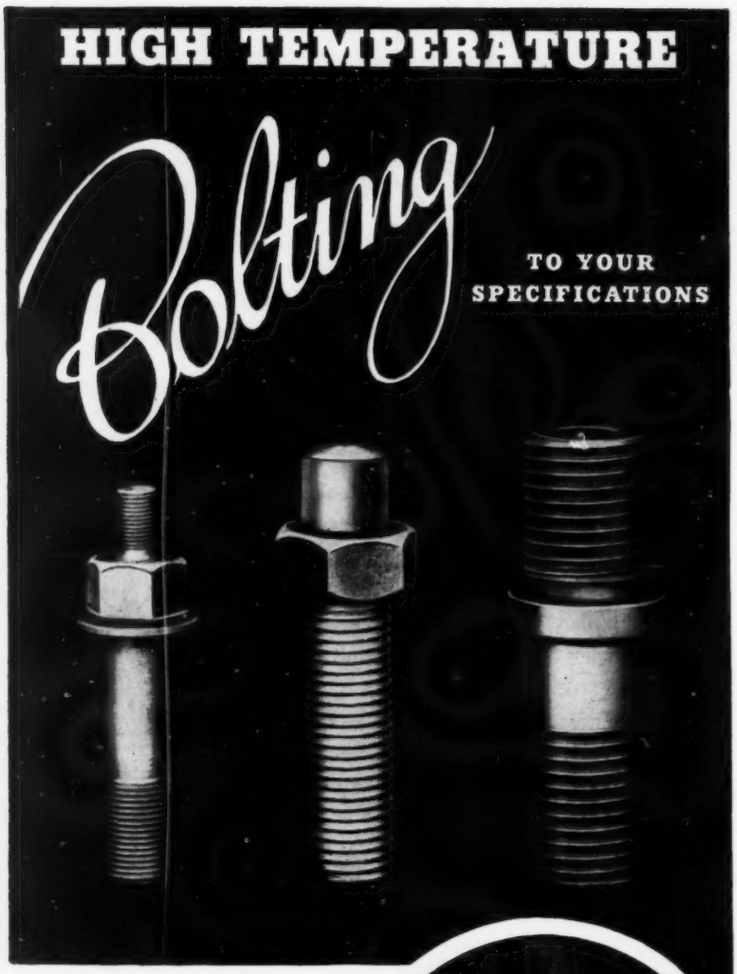

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(*Continued from page 92*)

The ethyl-benzene-cumene section comprises two sub-sections, both originally designed to turn out ethyl-benzene, one now turning out cumene. Of the two original sections, it now appears that owing to improvements in operating technique, one can produce sufficient ethyl-benzene to make the required amounts of styrene needed in producing the Buna-S rubber, and the other would normally be kept as a reserve to allow for cleaning or for use in case of a breakdown. However, when the demand for high-octane aviation gasoline soared to new heights, new anti-knock blending agents had to be found quickly. It developed that ethyl-benzene was an effective substitute, and both sub-sections were put into full operation. The two sub-sections turned out 4,000,000 pounds per month of ethyl-benzene, of which half went into styrene, and the other half was shipped out for blending with aviation gasoline. With some minor alterations, made during the past summer, one of the ethyl-benzene sections was switched over to making cumene. In the ethyl-benzene section, the ethylene is reacted with benzene over a catalyst to produce ethyl-benzene. In the styrene cracking section, the ethyl-benzene is dehydrogenated to produce crude styrene, the operation being somewhat similar to the dehydrogenation in the butadiene unit. In the styrene finishing section, the crude styrene is brought up to purity by fractional distillation, and the unreacted ethyl-benzene is returned to the styrene cracking building for further treating.

The cumene section is one of the original ethyl-benzene sub-sections converted to making cumene. Whereas in producing ethyl-benzene an ethylene "cut" from the light ends recovery unit is employed, in making cumene a propylene cut is necessary. The propylene also is piped from the light ends recovery unit. It is reacted with benzene to produce cumene. About half the consumption of benzene, or approximately 1,125,000 imperial gallons per year, is being used in making cumene. The output of cumene is at a rate of 2,500,000 pounds per month. Before the Buna-S unit at Polymer was in full operation, excess styrene was shipped to the United States in exchange for butadiene, which was not at that time being made at Polymer.

The styrene unit is operated for Polymer by Dow Chemical Company of Canada. By the use of a robot control and instrument board, the ethyl-benzene and cumene sections are jointly operated by two technicians and one helper on each of three eight-hour shifts. Similar control devices make it necessary to employ a total of only three men for the other two styrene buildings. Thus the equivalent of three fair-sized factories calls for only six men to a shift.

The Buna-S copolymerization unit conforms to current practice. Its rated capacity is 36,000 long tons, but this has been exceeded. The butyl rubber units, also of more or less standard design, is rated at 4,000 long tons a year.

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PETROLEUM PRODUCTS POST WAR

(*Continued from page 52*)

in heavy duty truck and bus tires. Synthetic tires for passenger cars are good. Some of those made so far will not stand high speeds over long runs. Tires may still be a limiting factor on consumption for some time but improvements in them, undoubtedly, will be made.

The unused facilities for producing aviation gasoline will be employed to make better motor gasoline. This will make for better engines and somewhat better efficiency. Based upon reports from our engineers and research department, I have assumed that the new passenger cars manufactured in 1947 will obtain 22 miles from a gallon of gasoline. For 1949 I have used a performance of 25 miles to the gallon and by that year 25 percent of the cars in use would be of these new more efficient designs. Offsetting these better performances, I have given a lesser efficiency to older cars so that on an average for all cars in use in 1949, I have assumed a performance of 17 miles to the gallon as compared with the present 15 miles to the gallon under normal conditions. Restricted consumption tends to decrease the present performance as most of the travel is of short distances with much stopping and starting. I doubt that the average mileage per gallon today is as high as 14 miles. Other products have been forecast in about the same fashion. These results are shown in Tables I and II.

The other most important market from a sales viewpoint will be house heating fuel oils. A detailed study on this subject had to be made covering number of occupied homes, sizes and location, probable future construction, relation of sales of new burners to new homes and conversions of old burners, kinds of new burners and probable consumption per burner, reconversion of burners, permanent improvements to homes made during war and changes in heating habits. All of these are reflected in the forecasts for home heating oils.

A few of the actual figures may be interesting. In the United States in 1941 there were in use an average of 2,243,000 home burners. By 1949 I forecast this market will increase to 3,500,000 homes having distillate oil burners. New homes to be built in non-farm areas should reach almost 1,000,000 a year by 1948 and 1949 as compared with 600,000 in 1941 and an average of only 465,000 for the five year period before the war. This means then that in the post war period there will be about twice as many new homes built and the burner industry will sell about one out of every seven an oil burner. In addition, of course, conversions of coal furnaces should continue but at a slower rate than before the war. Some of the areas in the United States have been fairly well converted to oil use and it will become increasingly more difficult to obtain conversions.

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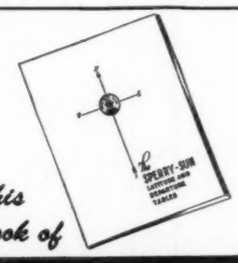

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USE OF PLASTICS IN WATER CONTROL

MANY and varied methods have been employed in the past for the exclusion of unwanted fluids from wells. Much of this work has been done by applying cement to a selected portion of the formation to render that portion impermeable, while leaving other portions of the formation unaffected. The use of plastics, introduced by the oil and gas well chemical service of Dowell, Inc., to accomplish the same end is rapidly gaining wide acceptance in certain fields, notably in East Texas, the Gulf Coast and parts of the Mid-Continent. More than 500 wells have been plugged to date using plastics. Some of the wells which have been plugged back with plastic have more than a year's producing history behind them, and to date these wells are producing with essentially the same water-oil ratio as immediately following the application of the plastic to the well. Of all the wells which have been plugged back with plastic since the inception of this method, more than 80 percent are considered successful.

The plastics being used in oil field work today are placed in the bottom of the well by means of a special, positive displacement dump bailer, or are introduced into the well through tubing and squeezed into the formation by volumetric displacement of fluid from the well. After the material has been placed on the bottom of the well, it is allowed to harden; if necessary, the process is repeated until the well has been plugged back to the desired point. The accompanying figure illustrates a typical bailer type plastic plug job in the East Texas Field.

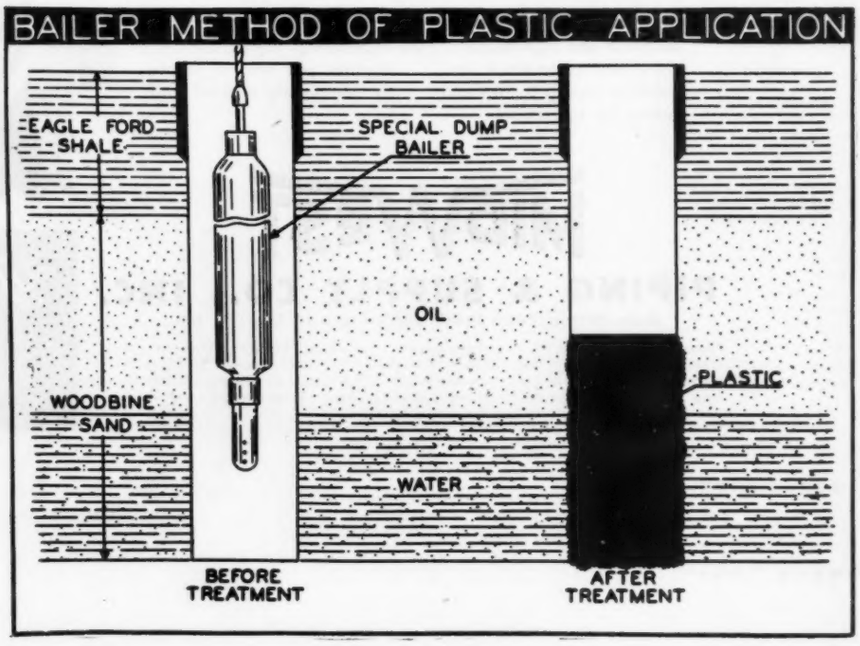
In Table 1, a summary is shown of the first 100 plastic plug back jobs in the East Texas Field wherein only a portion of the open hole was sealed off. Briefly, these data show that out of a hundred wells, 65 have had the water completely shut off, 18 had the water reduced by at least 50 percent, whereas in only 17 wells has the water production been reduced less than 50 percent. On wells making less than 25 percent water before treatment, more than 90 percent of the jobs can be classed as successful, and on wells making between 25 and 50 percent water, more than 80 percent can be classed as successful.

It has been found that any well having a pay section of more than 20 feet has an excellent chance of successful treatment with liquid plastic, regardless of the amount of water being produced.

TABLE I

Analysis of results on 100 plastic plug jobs in East Texas showing influence of water production before treatment

Amount of water before treatment	0-25 Percent		25-50 Percent		50-75 Percent		75-100 Percent			
	No. of Wells	Per-cent	No. of Wells	Per-cent	No. of Wells	Per-cent	No. of Wells	Per-cent	No. of Wells	Per-cent
Complete water shut off	31	89	23	77	8	40	3	20	65	65
50-100 percent reduction in water	3	8	3	10	7	35	5	33	18	18
Less than 50 percent reduction in water	1	3	4	13	5	25	7	47	17	17
Totals	35	100	30	100	20	100	15	100	100	100



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